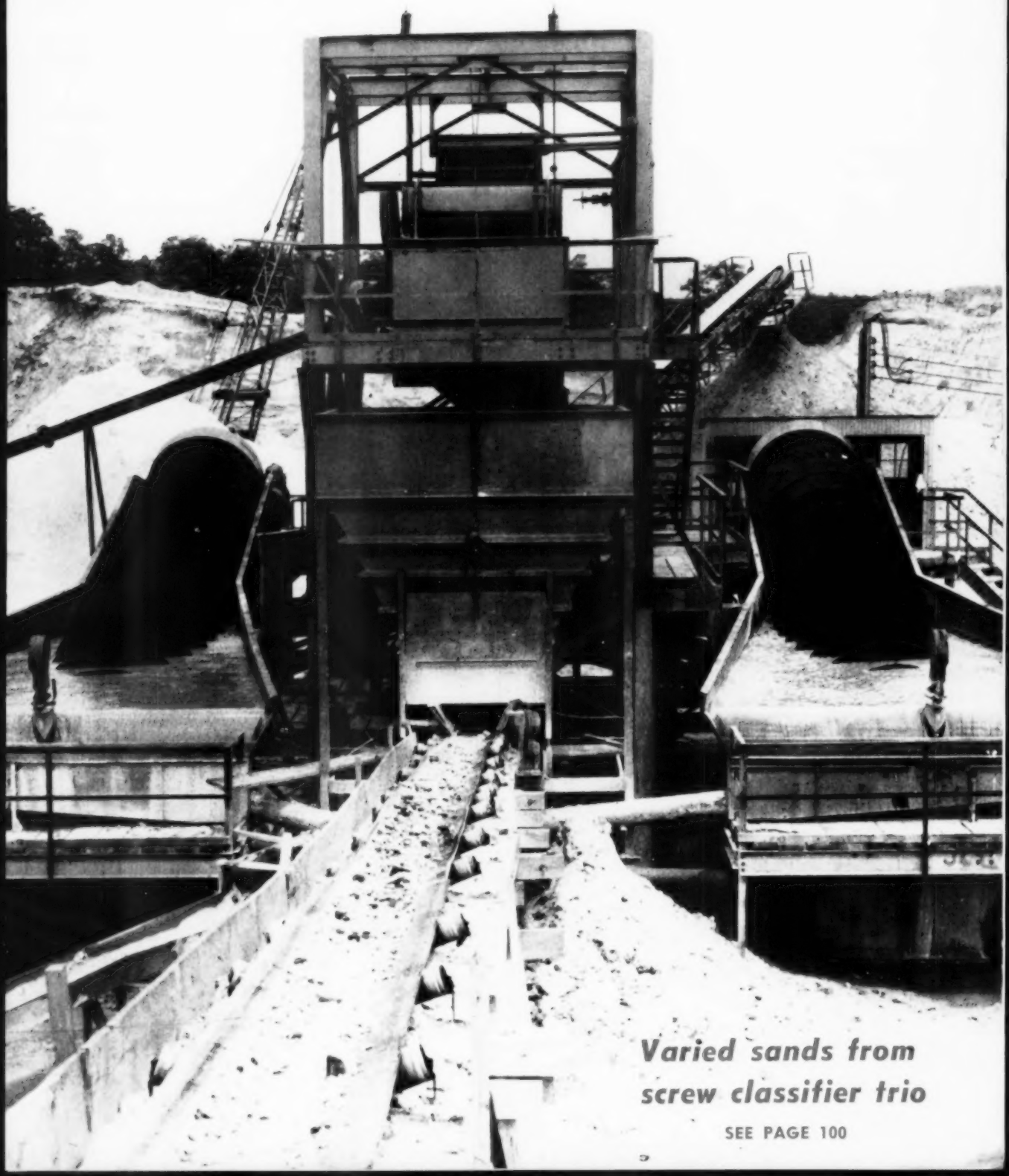
PIT and QUARRY

FEBRUARY 1959



Varied sands from screw classifier trio

SEE PAGE 100

these Quality Replacement Screens keep output high, costs low...

Be specific. Order wire screens by name. Durability, quality, accuracy vary widely! Ludlow-Saylor Screens insure precision and uniformity in meeting critical product specifications . . .

—won't bog down the plant with re-circulating loads that properly woven screens would have removed in the first pass . . .

—speed up the usual sluggish movement of feed across improperly woven screens . . .

—correct variations in crushing characteristics of raw material . . .

—cut frequent screen replacements, downtime and maintenance

Get better production from your investment in sizing equipment—*insist on Ludlow-Saylor Screens.*

Ludlow-Saylor Screens and Wire Cloth can be supplied in any steel including SUPERLOY high carbon, LUDLOY oil-tempered, stainless and other alloys; Monel, bronze, copper, brass or any metal that can be woven into wire.

Write for
Condensed Screen Reference Catalog

Immediate Shipment of most weaves and sizes

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DENVER, 1530 Carr St. • LOS ANGELES, Star Wire Screen & Iron Works, Inc. (Ludlow-Saylor Subsidiary), 2515 San Fernando Road.

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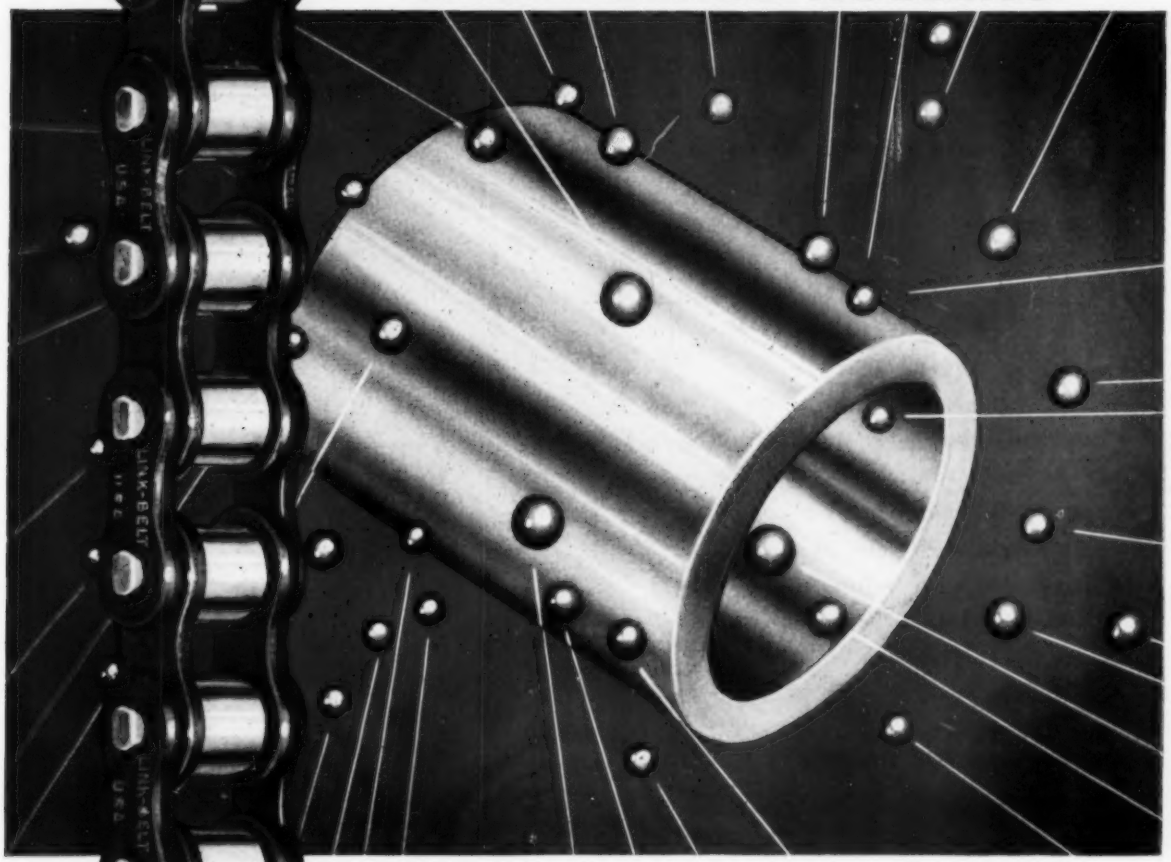
Shining example of "extra" chain quality

SILVER-BRITE

SHOT-PEENED ROLLERS



EXTRA LIFE IS POUNDED IN AND NOT POLISHED OUT

Rollers for Link-Belt precision steel roller chain are now finished by a special burnishing process to a "Silver-Brite" luster! And this is accomplished *without grinding away the benefits imparted by shot-peening*—a Link-Belt process that cold works the metal and provides extra fatigue life.

Many more special Link-Belt "extras" contribute to the dynamic strength so important for today's heavy loads and high speeds: close heat-treat control . . . lock-type bushings . . . pitch hole preparation . . . pre-stressing.

Ask your Link-Belt office or authorized stock-carrying distributor for new 154-page Catalog 2657—the most complete roller chain data book ever compiled.

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ROLLER CHAINS & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. LB.976

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Where Armco Liner Plate can save you time and money

Conveyor Tunnels

Tunnels of Armco Liner Plate are widely used under storage bins or piles. The corrugated metal design gives maximum strength with minimum weight. Gate openings can be provided simply by leaving out plates where desired. Circular structures are available in diameters from 4 to 15 feet in 2-inch increments.

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You can easily meet your storage requirements, too, with Armco Liner Plate storage bins. Capacities range from 50 to 3000 tons. The light weight steel plates are easily and quickly bolted together to form strong, long-lasting bins. If desired, you can dismantle an Armco Liner Plate bin and move it to another location.

Send coupon for details

The manual "Armco Liner Plate," will give you complete details. Just fill out and send the coupon below.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
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Send me manual TL-7854, "Armco Liner Plate." I am interested in liner plate for the following uses:

NAME

TITLE

COMPANY

STREET

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PIT and QUARRY

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VOL. 51 NO. 8

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New Ohio Crushed Stone Plant 74
Features quick flexibility, protection from operating delays, and attention to details.

Lime and Sand-Lime Brick Made from Desert Sand— 80
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Processed for industrial uses by manufacturer of clay brick, lightweight aggregates

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Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel, Slag and other nonmetallic minerals.

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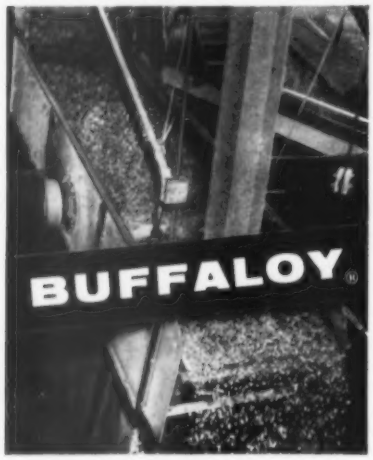
PIT AND QUARRY magazine was founded by H. W. Baumgartner, October, 1916.

To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

LONGEST SERVICE AT LOWEST COST PER TON



anti-abrasive wire cloth

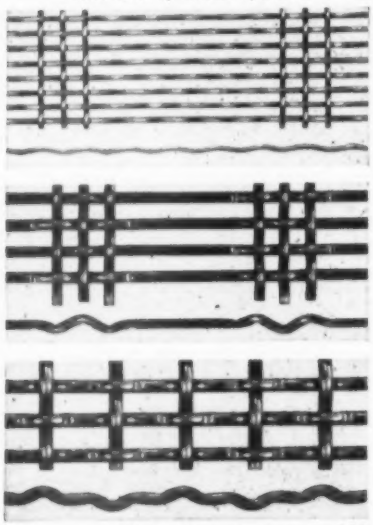
Here's the toughest mineral aggregate screen in the business . . . outperforming and outlasting screens that cost appreciably more. Specially processed for greatest resistance to wear, Buffaloy has both the hardness to hold up under severe abrasives and the flexibility to shrug off heavy shock loads.

Count on Buffaloy for many extra hours of service and substantial savings in your screening operations. Vastly superior to other high carbon wire screens, it is made in two grades:
Regular . . . for average conditions.
Super . . . . for highly abrasive materials.

Now available in an extra wide selection of weaves, mesh sizes and gauges — either as flat pieces or vibrator screen panels with special edges — Buffaloy can answer your every sizing need.

Get the complete story on Buffaloy and what it can do for you. Write for New Bulletin 600P.

BUFFALO WIRE WORKS COMPANY, INC.
526 Terrace, Buffalo 2, N. Y.



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pit and quarry

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FAST FOOT WORK Can Make High Output Possible!

THE NORTHWEST 80-D, 2½-yd. Shovel is a *real* Hard Rock Rig. It is readily adaptable to the varied problems that occur in pit mining and quarry service.

There are three 80-Ds in the Santa Catalina Quarries of the Connolly Pacific Company, and they have to be nimble rigs. One of these is brand new, the 16th Northwest in the growth of this progressive outfit. The new Northwest replaced an old 80-D that had been in service since 1942 and had handled upwards to 5,000,000 tons of rock and Basalt.

The quarry face is 200 to 250 feet high and is almost solid rock. Rock is fractured by dynamite and then the shovels by loosening key boulders start landslides. The shovels and trucks must move quickly to escape the cascading rock and overburden.

Northwests are built for jobs like this—Northwests load fast and move fast! Plenty of power combines with the Northwest Dual Independent Crowd that utilizes force most independent crowd shovels waste to cut through a bank or handle heavy digging without "stuttering". Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting accurate without losing time jockeying a load over the truck. The Cushion Clutch eliminates shock overloads before they reach machinery and the "Feather-Touch" Clutch Control gives the feel of the load and makes operation easy without resorting to pumps, compressors, and other delicate mechanism.

This is only part of the story. We would like to have you know the complete details on the size machine you need. Why not ask for a catalog?

NORTHWEST ENGINEERING COMPANY
1515 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

S-10-72

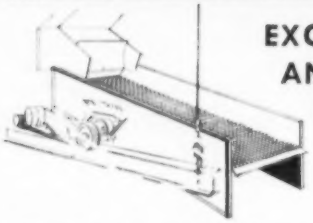
NORTHWEST Always Ready to GO

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 50-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

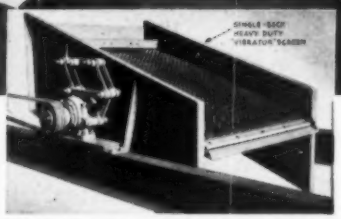
STEPHENS-ADAMSON

VIBRATING SCREENS

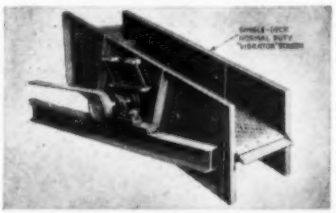


EXCLUSIVE CIRCULAR MOTION AND COUNTER FLOW ACTION PROVIDES HIGH CAPACITY, ACCURATE SCREENING

STEPHENS-ADAMSON Vibrating Screens combine strength with extreme accuracy in high capacity sizing operations. Vibration is produced by rotation of an eccentric shaft on which balance weights are mounted. The shaft is provided with self-aligning ball and roller bearings. Circular motion and counterflow action of vibrating screen provides for each particle passing over screen openings in every conceivable position before being discharged as oversize. Screen panels are reversible and screen body adjustable for maximum flexibility and life.



STYLE NO. 400 — Heavy duty vibrating screen will handle heaviest duty scalping and screening. Sub-frame for direct floor mounting or suspended mounting.



STYLE NO. 300 — Normal duty vibrating screen. Rubber seal strips between panel sides and screen body furnished with panels of less than ½" openings, preventing leakage and providing guidance over openings.

WRITE FOR BULLETIN 757

S-A
ENGINEERED BULK HANDLING SYSTEMS
STANDARD MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERCO® BEARINGS & ROD ENDS

STEPHENS-ADAMSON MFG. CO.

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PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

Hagan Dust Collector Tube shows

no erosion

after collecting 160 tons of slag dust

The collector tube shown here was cut from a 184 tube Hagan Aerostatic Dust Collector installed on a blast furnace slag dryer at the Neville Island Plant of the Pittsburgh Coke and Chemical Company. The collector has been in operation for more than two years, collecting slag dust at the rate of 23,400 tons per year.

The dust loading from the slag dryer is about 25 grains per cu. ft., almost ten times the loading from the average coal fired boiler and many times more abrasive. During its two years of operation, the Hagan collector has been consistently operating at 93% efficiency, despite the extremely fine dust it has been handling.

This Hagan collector not only enables Pittsburgh Coke and Chemical to comply with rigid air pollution regulations, but recovers valuable material as well. Add the economies that result from the sharp reduction in maintenance costs, plus the fact that the Hagan Collector is easily installed, and you have a cost picture that offers both short range and long term economies.

Get the full facts on how the exclusive Hagan principle of Selective Particle Acceleration can save you money. Write for Bulletin MSP-124 A.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.

In Canada: Hagan Corporation (Canada) Limited, Toronto
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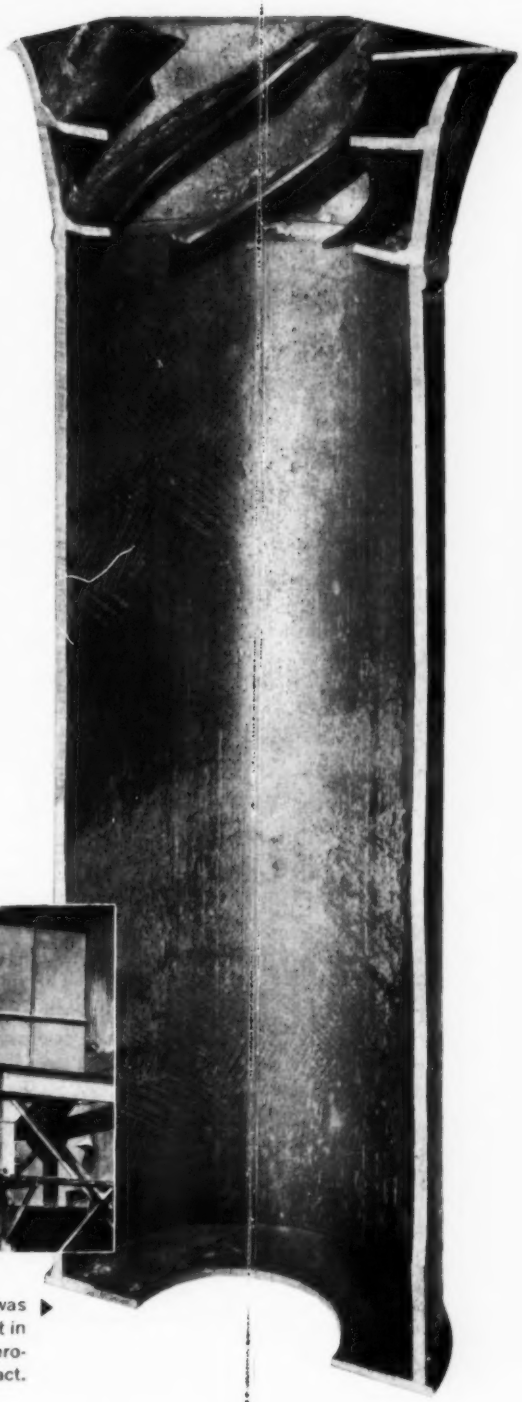

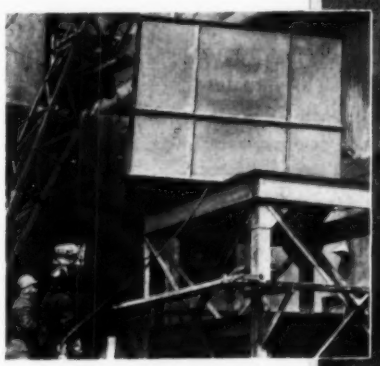

Installation of a Hagan Dust Collector. The fast installation possible with the fully pre-assembled Hagan unit is a money and time saver.

More than 160 tons of highly abrasive slag dust was collected by this tube over a period of 15 months. Cut in half for inspection, the tube shows no evidence of erosion; in fact, most of the mill scale still remains intact.

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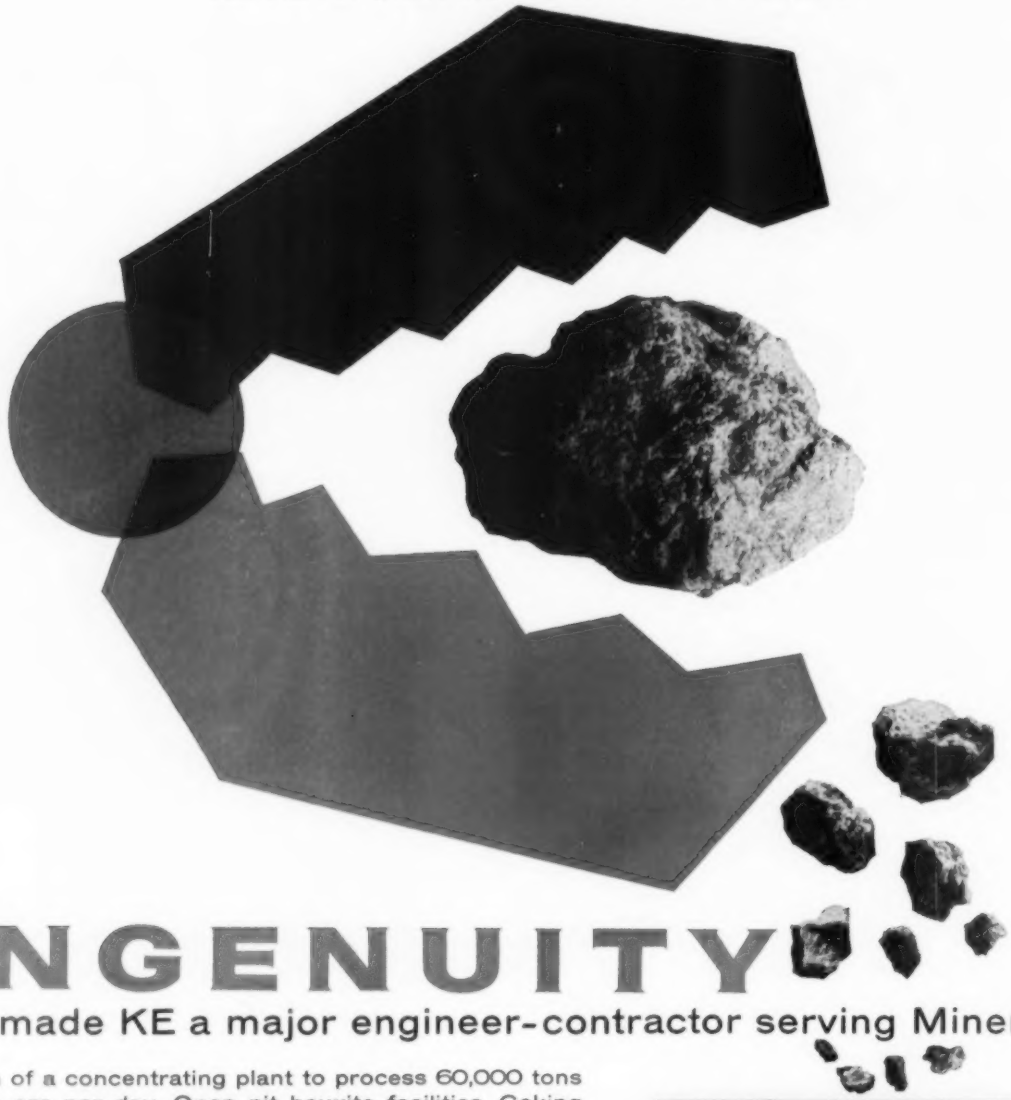
call KE for plant expansion or new facilities



INGENUITY

has made KE a major engineer-contractor serving Minerals

Design of a concentrating plant to process 60,000 tons of iron ore per day. Open pit bauxite facilities. Coking coal processing plants. Diatomite plants. Cement plants. These are a few of many projects and studies Kaiser Engineers undertakes for the Minerals industries in the United States and world-wide—Quebec, Jamaica, Mexico, Brazil, Australia, New Zealand, Greece, Turkey, India.

From determination of process through design and construction of complete facilities, KE can perform any or all steps. And perform them with Ingenuity—to produce a more efficient operation, in less time, at lower cost.

For your next facility—whether ferrous, non-ferrous or non-metallic—call KE.

Pendulum ore conveyor—Ingenuity produced KE innovation distributing beneficiated iron ore in 180° crescent; conserved space, cut rehandling costs.

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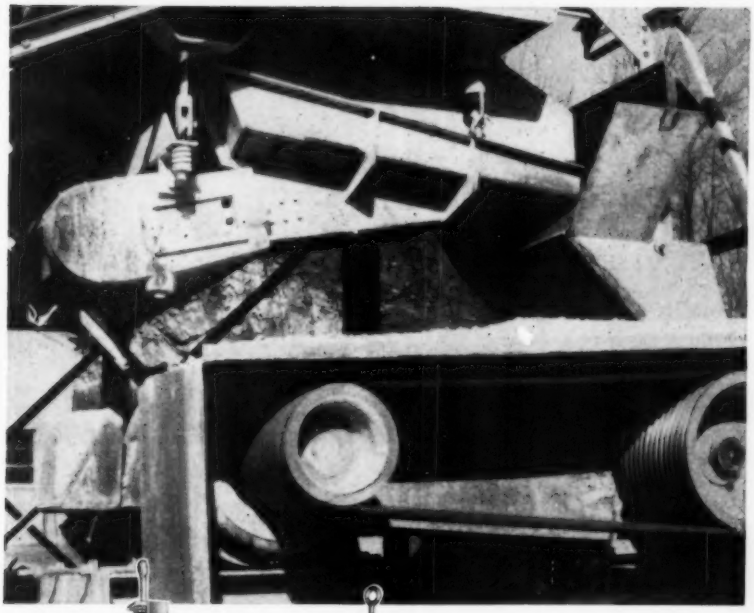
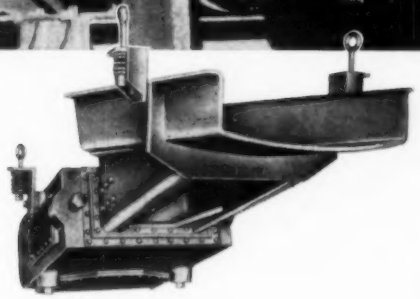
SYNTRON Vibra-Flow

VIBRATORY FEEDERS





Feeding stone from scalper to secondary crusher

Reduce bulk materials handling costs

SYNTRON Vibratory Feeders are designed for efficient, dependable, high capacity handling of sand, gravel, limestone, run—of quarry rock.

SYNTRON Feeders are durable, constructed to withstand heavy load impact and excessive wear of abrasion. Powered by an electromagnetic principle that eliminates motors, gears, bearings and belts and assures dependable operation with low maintenance.

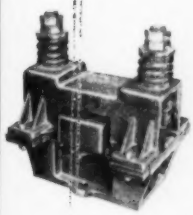
SYNTRON Feeders supply a smooth uniform, flow of materials to belt conveyors, crushers, screens, ball mills, and other process equipment. Rate of feed is instantly adjustable to meet production demands.

SYNTRON offers a wide range of Feeder sizes and models with capacities from 1 to 3000 tons per hour. All with variable control of feed rate.

Let SYNTRON cut your materials handling cost and increase production.

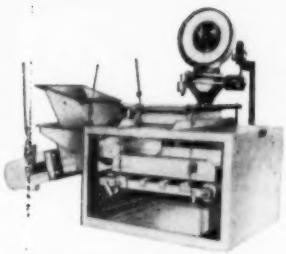
Write for complete catalog data—FREE

Other SYNTRON Equipment of proven dependable Quality

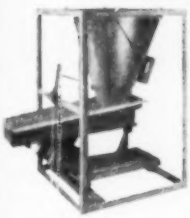


BIN VIBRATORS

VIBRATING SCREENS



GRAVIMETRIC FEEDERS



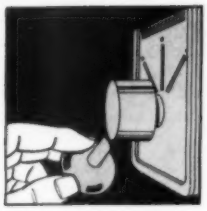
DRY FEEDER MACHINES

TEST SIEVE SHAKERS

SYNTRON COMPANY

385 Carson Ave. Homer City, Penna.

Crushing Specification Stone?



Change product size in less than a minute

SIMPLY flip the switch of the *Hydrocone* crusher to change product size. The exclusive *Hydroset* mechanism raises or lowers the crushing cone hydraulically for precise control. Crushing chamber design and choice of eccentric throws also assure uniform cubical characteristics and even distribution. Only the *Hydrocone* crusher offers the speed and convenience of "one-man, one-minute" product control in producing quality stone to meet rigid specifications.

Adjusts for wear, clears tramp iron and releases jams

To compensate for wear on the mantle and concave, you raise the mainshaft — by flipping the switch. And if your *Hydrocone* stops under load, you don't waste manhours digging out — just flip the switch again. In addition, you get protection against tramp iron and other uncrushable materials with an automatic reset in the hydraulic system.

To get all the details on the fastest and most efficient crusher operation, ask your A-C representative for Bulletin 07B7145B. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

Product from *Hydrocone* crusher is uniformly cubical in all sizes.

Hydrocone and *Hydroset* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5594

Washington News Letter

By S. HERBERT UNTERBERGER

IF the trends which are already obvious continue to develop, the 86th Congress may turn out to be the most contentious that we have seen for some time. This does not bode well for its establishing any substantial record of achievement. Although this may not be so serious with respect to domestic issues, since we seem to have reachieved a reasonable measure of prosperity despite political bickering and differences, it may turn out to be a most serious matter on international matters. Here the strength of unanimity, or at least an approach to unanimity, is most essential to the maintenance of a position of leadership on the part of United States.

The initial skirmishes, while not of critical importance in themselves, are, however, symptomatic of the underlying situation. Probably because of their exceedingly inadequate showing in the recent November election, the problems of the Republicans have become more public.

The elimination of Representative Joseph W. Martin Jr. of Massachusetts as House Leader, although not totally unanticipated, nevertheless took most of official Washington by surprise. To be sure, the substitution of Representative Charles A. Halleck of Indiana involved no fundamental change in the political complexion of the House leadership. However, the very fact that the revered Congressman Martin, who held the position of leadership for 20 years, could be dumped so unceremoniously indicates a lack of stability, a searching for new ways, and—most importantly—some change in the power forces within the Republican Party.

On the Senate side, the stresses and strains were even more apparent. There, too, the final selection of Senator Everett Dirksen of Illinois for leader, continued the leadership in the same conservative Republican hands as in previous years. The senators who are members of the so-called liberal branch of the Republican Party, however, did not come away from the contest completely empty handed. Although they were not able to achieve acceptance of their selection of Senator John Sherman Cooper of Kentucky for the post of minority leader, they did succeed in implementing their choice of Senator Thomas H. Kuchel of California as Senator Dirksen's assistant. This was clearly a compromise settlement and, again, revealed a significant change in the power forces.

On the Democratic side, all the incumbent leaders were elected without any contest. Senator Lyndon B. Johnson of Texas again became the Senate majority leader, and Representative Sam Rayburn, also of Texas, became Speaker of he House.

But, having accomplished this much, the united front promptly fell apart. The issue, of course, was the attempt to change Senate Rule 22, which, in its present form, permits filibustering, unless two-thirds of the members of the Senate (which now requires 66 senators,) vote to shut off debate. It has been possible to win such a cloture vote only four times since this rule was first instituted in 1917.

Although the group of so-called liberal Democrats and Republicans who wanted to change this rule to the requirement for a simple majority vote were quickly overwhelmed by both the parliamentary adroitness of Senator Johnson and the support of his colleagues, which he knew he could count on, they, nevertheless, won a concession. The substitute rule which Senator Johnson himself backed will reduce the number of Senate votes required to impose cloture to a point at which in extreme situations, as few as 34 votes could accomplish the purpose.

The possibility that such a situation could actually occur is probably less significant than the fact that most of the Senate has recognized the inevitability of some change in this rule which, in its previous form, had repeatedly permitted a small group of willful senators to paralyze the Senate in order to prevent that body from considering a piece of legislation which was distasteful to them. This recognition, too, reflects an awareness of change in the power forces.

As a matter of fact, this awareness implies Southern reconciliation to the fact that in the not too distant future, perhaps in this session of the Congress, stronger civil rights legislation will be debated—and perhaps even enacted. Although the conservative branch of each of the parties continues to be in nominal control, these groups are in a position to maintain their control only by giving increasing concessions to the so-called liberals. It has been argued by some members of the Washington press corps that, in this situation, the conservatives are virtually the prisoners of the liberals. A case can even be made out that they would be more effective as a vocal minority than in their positions of leadership, where they frequently find it both expedient and necessary to keep silent or to play their tunes with the "soft pedal."

(Continued on page 71)

NEW SAUERMAN SLACKLINE CABLEWAY INCREASES PRODUCTION OVER 25%

Bucket breaks water with heaping load from a 100 ft. depth...

Wherever deep digging is required and operating spans are long, the new Sauerman Slackline is adding to its margin of superiority over other types of excavators. Production increases of over 25% and in some unusual cases as high as 80% are reported.

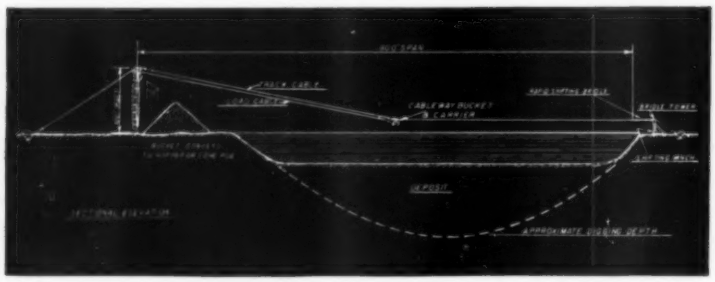
Not only is production increased but operating costs are lowered as cable and hoist wear is reduced and the machine runs with fewer peak loads and shocks—all possible from a cushioned drive using a torque convertor and other refinements.

These benefits are also available to present owners of slackline cableways. Guaranteed Gravel & Sand Co., a Sauerman Slackline user for over 35 years, has increased hoist speeds from 230 to 350 fpm. on the digging cycle and conveying speed to 800 fpm.—a gain of 25%. Guaranteed's 2-cu. yd. bucket is digging 450 ft. away from the surge pile and delivers 150 cu. yds. per hr.

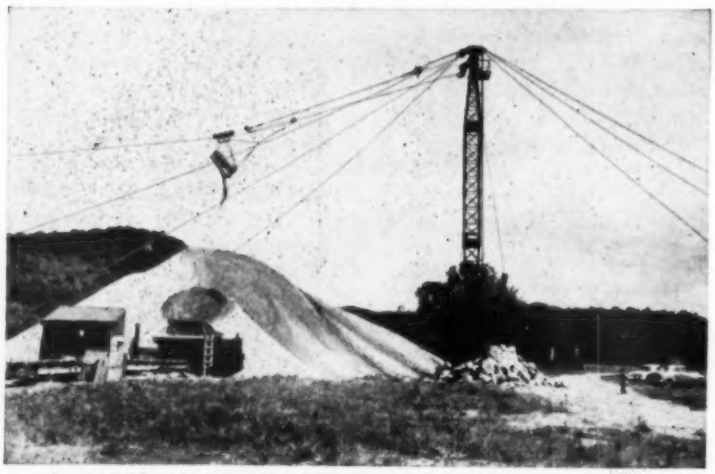
The Sauerman Method lets you work distant material—up to 1,000 ft. away and dig 100 ft. or more below water. Now more than ever the greater tonnage available through fluid drive operation makes a Sauerman Slackline Cableway the low cost way for deep digging.

Get the best machine for your job. Write to Sauerman for expert advice on any materials handling project. For additional information on slackline cableways, ask for Catalog C.

is conveyed and dumped automatically at surge pile.



Above drawing was prepared for a specific slackline installation and does not represent maximum spans. Rapid shifting bridle is not needed for many deposits.



Guaranteed Gravel and Sand Co.'s slackline bucket dumps 150 cu. yds. per hr. on surge pile from digging point 450 ft. away.

SAUERMAN BROS. INC. 634 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Labor Developments

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D. C.-Philadelphia, Pa.

UNDER the headline, "Labor Trouble Feared," the New York *Times* for Sunday, January 11, 1959, reported that Joseph F. Finnegan, chief federal mediator, had predicted a "rough year" at the collective bargaining table.

"Mr. Finnegan said in an interview that he believed management would take a tougher attitude toward union demands partly because of cost-cutting and lay-offs during the recession," the *Times* stated.

Apparently, the AFL-CIO leadership agrees with this appraisal since it devoted the most recent issue of its monthly *Collective Bargaining Report* entirely to the subject of strikes. Much of the discussion was devoted to AFL-CIO support of the proposition that "strikes are becoming a less important rather than a more important factor in American life." Here the Report pointed to U. S. Bureau of Labor Statistics data, which show that for 1957, strikes occurred in only 3 percent of the collective bargaining situations, involved only 2 percent of the total non-agricultural work force, and resulted in idle man-days equal to only 0.14 percent of the total work time of all workers.

Along the same lines, the Report pointed out: "The number of man-days idle in 1957 was well below the total for 1927, and about the same as for 1933. Meanwhile, however, the total number of workers has risen 70 percent and union membership over six times." Continuing, the Report declares, "The extent of idleness caused by strikes in 1957 was the lowest of all post-war years, and, except for 1940 and the war years, was the lowest since 1931." Finally, it states that "the average duration of stoppages, 1953-1957, for example, was less than 20 calendar days, compared to about 24 days for a similar five-year period, 1927-31."

"Nevertheless," it concludes, "strikes will continue to occur." There follows a review of the rules for operating successful strikes. These rules are reproduced here because it is believed that they should make especially interesting and useful reading for employers facing 1959, with its special high strike rate potential.

"No hard-and-fast rules can be set forth for the conduct of strikes," the Report concedes. "However, it is possible to list a few points which unions have found useful as a check-list of possible questions that must be considered by any union in a strike situation.

"Adequate Preparation—In many respects, a strike is the ultimate test of a labor union. A well-planned and well-administered strike can raise the morale of a worker and his faith in trade unionism as positively as a poorly-planned and poorly administered strike can wreck it. Therefore, a strike should never be taken lightly. And a union should never rush into a strike unless it is adequately prepared for it—and has some reason to believe that it can win.

"Informing the Membership—Unions recognize the importance of keeping their members currently and regularly informed on the status of negotiations, preparations for the strike, and activities during the strike. The intense feelings that the strike may arouse often provide an atmosphere for the circulation of all types of rumors. A program of providing the union membership with current information about the strike will generate a better feeling of confidence and maintain the morale of union members.

"Legal Status of Strike—Federal, state, and even local laws can affect the legality of actions taken before and during a strike. Federal laws set forth requirements of notices and waiting periods that must be observed before a strike can be called. State laws may set additional requirements or can impose restrictions on picketing or other types of strike activity. Local ordinances may also affect the conduct of the strike. Unions have generally adopted the practice of consulting an experienced attorney regarding union policies or actions which might be attacked on legal grounds.

"Health, Welfare and Retirement Benefits—It is important for the union to know in advance how the strike will affect any benefits its members have been receiving from health and welfare or pension funds. Unions have found it possible in many cases to work out arrangements for preserving the workers' stake in these funds and in some cases for continuing these benefits to union members during the strike.

"Support of Other Unions—Unions on strike have found it to their definite advantage to make certain that other interested unions in the industry or area are kept up-to-date regarding strike developments. Often the central labor body in the area concerned will be able to provide some assistance to the striking union. Other unions will often want to help in whatever way they can, although the type of assistance that they will be able to provide is very specifically limited under the Taft-Hartley law.

"Support of Local Community—The attitude of the local community may often mean the difference between success and failure in strike action. Unions generally have care-

(*Continued on page 71*)

Rubber arteries serve the heart of this aggregate plant

Acme-Hamilton conveyor belting, nearly a mile of it on 16 Barber-Greene conveyors, carries aggregate from the pit to this washing, crushing and screening plant, stockpiles the different products, then loads them on barges. 4 men operate the entire plant! Impossible without dependable, trouble-free conveyors and Acme-Hamilton belting.

Cushion Covers, reinforced edges defy pounding impacts, cuts, abrasion and edge wear.

Breaker Fabric. Optional double cord fabric acts as second cushion, increases cover adhesion.

Fabric Plies. Impregnated with rubber add strength.

Rubber Skim Coat. Provides a resilient bed between plies.

Write Acme-Hamilton, Dept. Q2.

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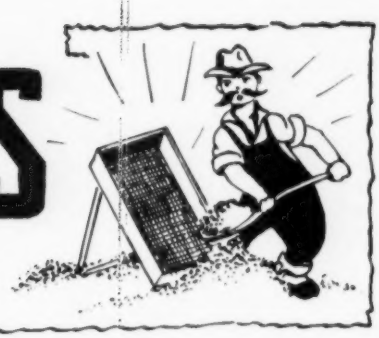
SCREENINGS



By RAY L. SMITH JR.

IT SEEMS timely at this point to pass on to our readers a gentle reminder that this department of their favorite journal was originally conceived as a participating venture rather than as a platform from which to launch monthly monologues. Although we had sufficient response to encourage us to continue, we feel confident that the Chicago Post Office has not so far found it necessary to hire extra employees to handle the additional mail drifting toward 431 South Dearborn Street.

Letter writing, of course, is in most respects a nuisance, and we are thoroughly in sympathy with people who abstain from the practice as much as possible; in fact, we are abstainers ourselves. But in this instance we wish our readers (yes, that's plural!) would try a flyer into the realm of pure frivolity now and then, and send us copy suggestions. We suggest the three-cent post card as a substitute for the formal letter; it is not only economical, but it enforces a certain frugality in verbiage which cannot help but conserve time at both ends of the line. Contributors may remain anonymous if they so desire.

Concreat?

A CHAP in California was arrested the other day because he was a poor speller.

Officers arrested the poor guy after receiving a tip from a grocer, who reported the name "Pacific Coast Concreat and Construction Co.," on a check.

The grocer told investigators he also noticed the identification card the poor guy presented spelled Syrian as Searin.

Police said worthless checks totaling $50,000 had been passed in one county during a few weeks. All contained the misspelling of concrete.

As long as this quaint aberration is confined to California we don't see any point in making an issue of it. But if it starts creeping over the border into the *United States* we're going to start a defense fund.

Potpourri and Succotash

Nagging Wife: "Are you sure you'll love me when I am old and ugly?"

Husband: (reading paper) "Sure I do."

"It scares me to death every time I hear one of those musical auto horns."

"Why is that?"

"The fellow who stole my wife had one on his car. Now every time I hear one of those horns, I'm afraid he's bringing her back."

"My, what a pretty watch," said the man, admiring a small boy's new timepiece. "Does it tell you the time?"

"No, sir," replied the little fellow, "you gotta look at it."

A Nebraskan, an Ohioan and a Texan died, and all were scheduled for cremation on the same day.

The Nebraska man was cremated first, and when his ashes were removed, they were put into a quart jar. The Ohio man was next and his ashes required a pint container.

The Texas man was last. After 15 hours, the furnace door was opened. Out walked the Texan, mopping his face with his handkerchief.

"Boy," he said, "if we get two more days of this hot weather, it'll ruin the cotton for sure!"

An old lady went to a tombstone cutter's office to order a stone for her husband's grave. After explaining that all she wanted was a small one with no frills, she told him to put the words, "To My Husband," in a suitable place. Upon delivery, to her horror, she saw the words: "To My Husband, in a Suitable Place."

Johnny's mother was lecturing him on the wrongness of his aggressive ways. When the little boy next door threw stones, she emphasized, Johnny should not have thrown them back but should have come to tell her.

"Why?" said the youngster with an unbelieving expression. "Daddy always says you couldn't hit the side of a barn."

The patient complained to his psychiatrist that he kept dreaming of a girl, dressed in next to nothing, who ran in and out of his room.

"Well, is that such a bad dream?" asked the psychiatrist.

"I don't mind the dream, exactly," retorted the patient. "I just wish you would stop her from slamming the door."

Two golfers, strangers to each other, happened to meet on the golf links.

"See that girl over there?" said one. "Imagine her parents allowing her to appear in clothes like that. Just copying men's clothes."

"That, sir, is my daughter," said the second golfer.

"Oh pardon me, I'm sorry. I didn't know you were her father."

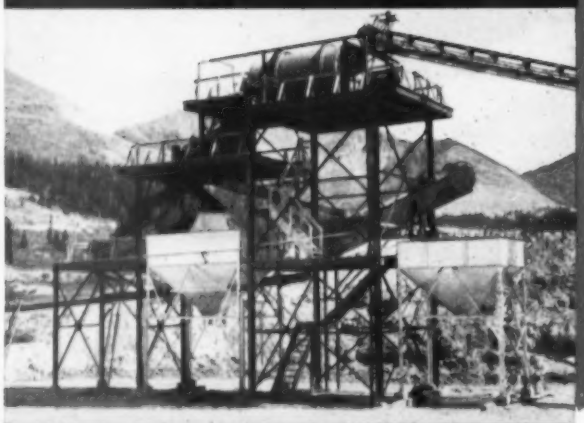
"I'm not. I'm her mother."

An irate lawyer, trying to establish a point in cross-examination, demanded of the defendant: "Madam, while you were taking your dog for a walk, did you stop anywhere?"

"Sir" the witness said quietly, "have you ever taken a dog for a walk?"

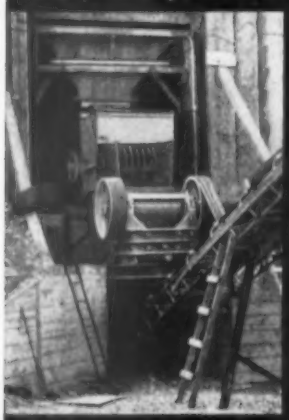
COLORADO Concrete Aggregate Plant

C. Ryan & Son aggregate plant near Climax, Colorado



TELSMITH designed and equipped

Telsmith Super-Scrubber, Vibro-King Finishing Screen, and Sand Classifier, and Gravel Rewasher over steel bins



Feeder, Rotary Grizzly and 15x38 Jaw Crusher

Scalping Screen, and Gyrasphere Secondary Crusher

The C. Ryan & Son aggregate plant, near Climax, Colorado, makes three sizes—minus 1½" plus 7/16", minus 7/16" plus ¼", and minus ¼" sand. This *complete Telsmith plant* has a capacity of 100 tons or more per hour and its products are used to make concrete aggregate for large industrial companies. Let Telsmith engineer your plant for big capacity, product flexibility, and low-cost efficient operation. Send for Bulletin 266.

TELSMITH EQUIPMENT IN THIS PLANT

30" x 5'6" Heavy Duty Plate Feeder • No. 450 Rotary Grizzly • 15 x 38 Roller Bearing Jaw Crusher • 3' x 10' Single Deck Vibro-King Scalper • 36-S Gyrasphere Secondary Crusher • 72" x 10' Super-Scrubber • 4' x 10' Double Deck Vibro-King Finishing Screen • 20" x 13' Twin Screw Rewasher • 24" x 19' Single Screw Sand Classifier • Three (3) Belt Conveyors.

G-31

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New manufacturing facilities at U. S. Steel have now made possible forged steel grinding balls with three outstanding characteristics:

HARDNESS

The hardness patterns obtained in USS Grinding Balls assure superior grinding qualities and long service life in all types of grinds.

TOUGHNESS

To resist breakage, each size and type of USS Grinding Ball has the maximum toughness compatible with its depth of hardness.

UNIFORMITY

The exacting controls that are necessary in processing, particularly heat treatment, combined with frequent laboratory checks, insure consistency in quality—ball to ball and load to load.

There are two types of USS Forged Steel Grinding Balls available: USS Carbon-Manganese, for most mill operations, and USS Alloy Steel, for unusually severe grinding conditions. Both types are manufactured in the same sizes: ¾″, ⅞″, 1″, 1¼″, 1½″, 2″, 2½″, 3″, 3½″, 4″. To find out what makes the "good" grinding ball *you* need, send for our new free booklet, today. Just fill out and mail the coupon.

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Tennessee Coal & Iron—Fairfield, Alabama
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USS **United States Steel**

CATERPILLAR'S PROJECT PAYDIRT

PROJECT PAYDIRT *pays off for you*

NEW CAT D8

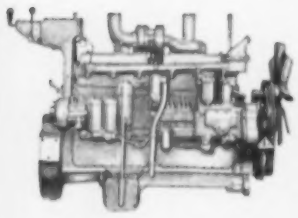
PUSHLOADING: PRODUCTION UP

The new Caterpillar D8 Series H Tractor is ready *now* to increase its lead as undisputed king of its size class. A major achievement in Caterpillar's all-out research program, "Project Paydirt" (see box), the new D8 has been proved through a rigorous field testing program.

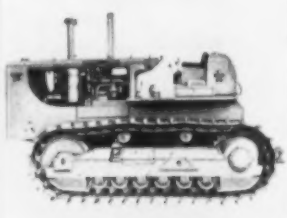
This D8 is new in design, appearance and performance. It is bigger, more powerful. It incorporates new engineering advances. It is easier to operate.

Now—what can it do for you? Here's the answer: The D8 has been thoroughly field tested on actual jobs. Several of the big new tractors have been at work constantly in every kind of material. Out of the statistics developed, both pushloading and bulldozing production figures are *up*.

This means that you can move dirt faster and cheaper than ever before with a tractor in this size class. You

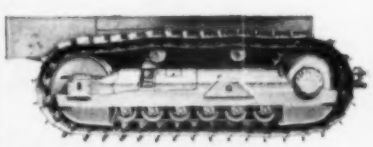


HORSEPOWER INCREASED 18%. The horsepower of the new D8 is up from 191 to 225 at the flywheel, from 155 to 180 at the drawbar. In addition, engine torque rise now is 20%, an increase of one-third. Over-all engine performance has been greatly improved by the addition of a turbocharger.



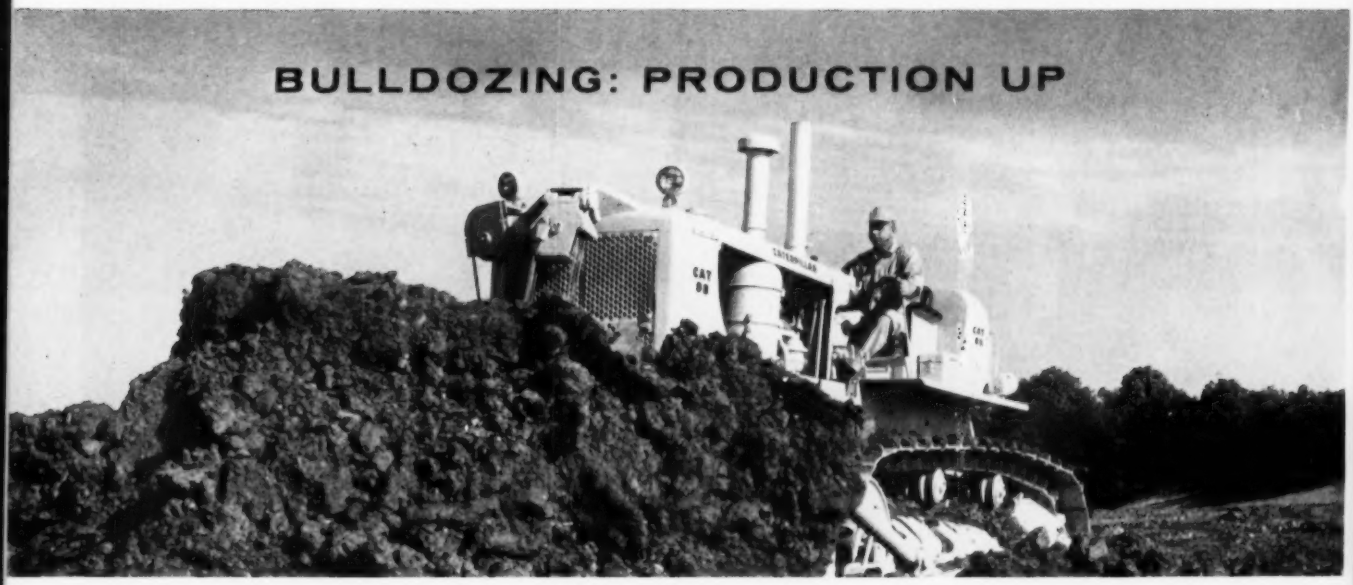
SIZE INCREASED. To make effective use of the new horsepower, over-all weight of the tractor has been increased 4,400 lb. to a total of 47,000 lb. At the same time the gauge has been increased to 84 inches, track on ground lengthened to 114 inches, square inches of contact increased to 5,505.

LIFETIME LUBRICATED ROLLERS AND IDLERS. That's right—lifetime! In a major research breakthrough, Caterpillar has achieved track and carrier rollers and idlers that never require further lubrication until rebuilding. And service life is hundreds of hours longer than with ordinary rollers.



NEW, STRONGER, HEAVIER UNDERCARRIAGE. Every component, such as frames, links, braces, pins, bushings, shoes, has been made stronger by the use of improved materials and heat treat processes to provide longer life. And ground clearance has been increased 50% to almost 20 inches.

SERIES H TRACTOR



get higher production, bigger profits—yet the new D8 is actually *more economical* to own and operate!

But find out for yourself. Get the full story from your Caterpillar Dealer, all the eye-opening facts and figures that can only be touched on briefly here. Then *see* this great new machine at work on your operation as soon as possible. You can't afford not to!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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BORN IN RESEARCH...
TESTED IN THE FIELD

DRY-TYPE AIR CLEANER. Here's still another major Caterpillar research development on the new D8—the new dry-type cleaner which removes 99.8% of dirt in the intake air, even under severe operating conditions. The new cleaner can be serviced in 5 minutes, costs a good deal less to use.

SUPERIOR OPERATION. Operator visibility is excellent because of higher deck and changed seat position. Console-type controls make operator's job easier. And on torque converter models, standard foot-operated decelerator can override hand throttle—free operator's hands for other controls.

TWO MORE IMPORTANT OPERATOR CONVENIENCES

HIGHER SPEED. Completely new, long-life, direct drive transmission provides six speeds forward and six reverse. High speed has been increased to 6.3 MPH forward, 6.4 reverse to reduce cycle time. Operator can shift from any forward gear into a similar reverse gear (or vice versa) by simply moving the forward-reverse lever.

DEPENDABLE OIL CLUTCH. By contractor and operator demands, the virtually service-free, easy-to-operate oil clutch has been retained in the new D8. Another important Caterpillar exclusive.

CATERPILLAR'S **PROJECT PAYDIRT**

PROJECT PAYDIRT: Caterpillar's multi-million-dollar research program—to meet the coming challenge of the greatest construction era in history with the highest production earth-moving machines ever developed.

Enter 18 on card, page 123

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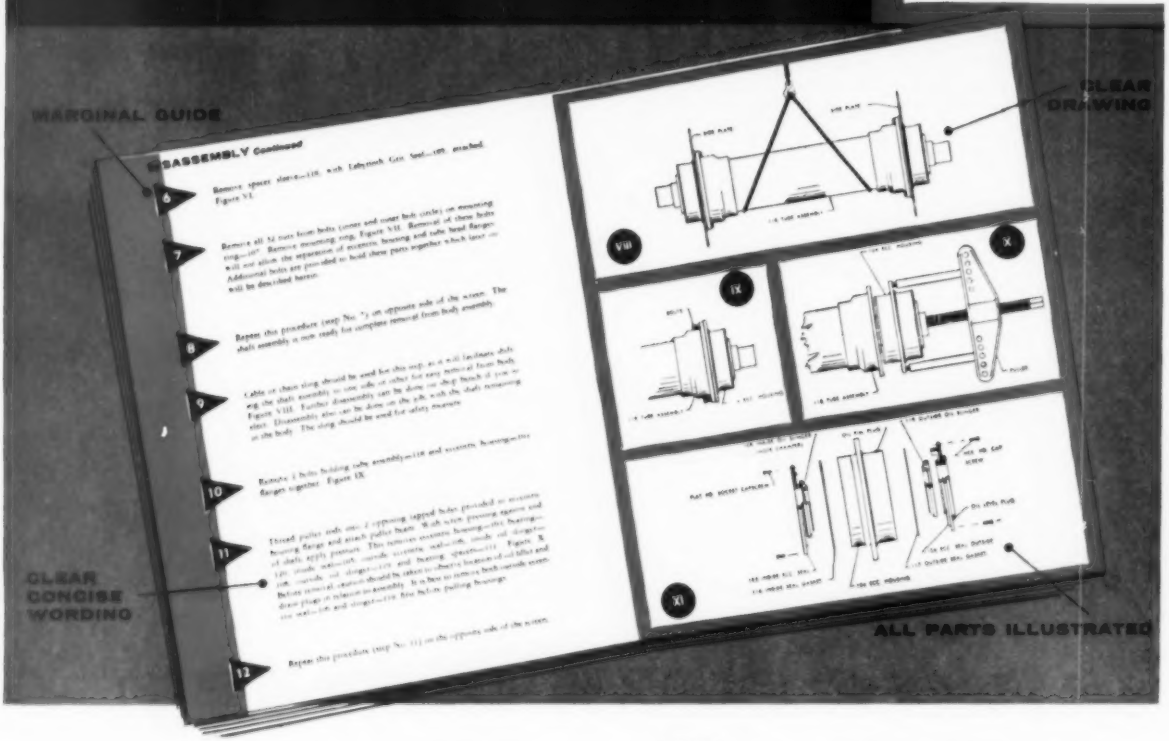

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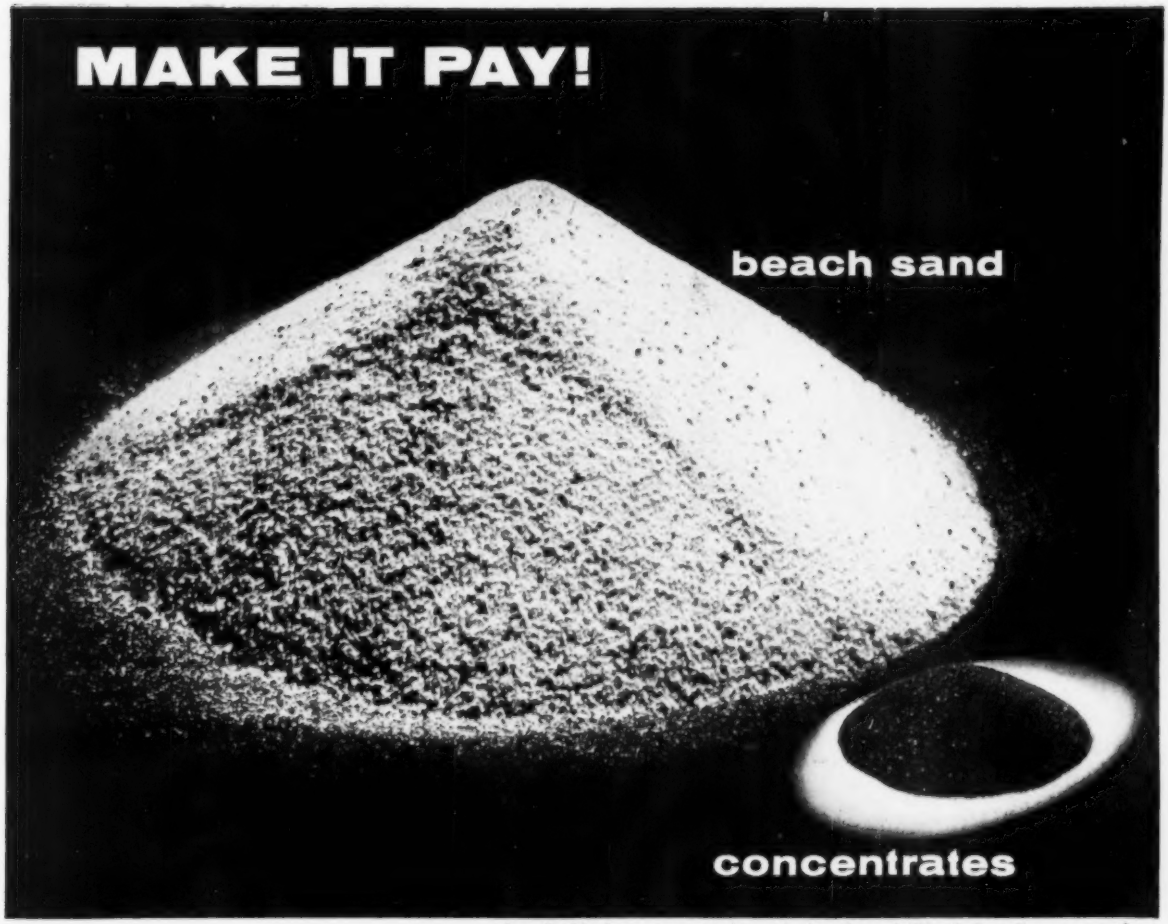

See the black concentrates from the beach sand. The Jeffrey jig recovers these.

Jeffrey jig concentrates valuable materials

A beach sand operation yields 3% ilmenite... a black iron titanate, which lends valuable characteristics to abrasives, cement, electrodes, lamp filaments and other critical products. A slag yields profitable amounts of chrome for remelting by a producer of ferro chrome. Gravel is jigged to 0.6% shale or lower... well below the 1% limit required by State specifications.

The Jeffrey jig is so flexible, so efficient that it can be adjusted to all these exacting separations... handles them as easily and surely as it does routine separations. Down-stroke separation is a distinctive feature that makes the air-operated Jeffrey jig effective over a great size range. Capacity per unit of area is exceptionally high... much higher than that of any competitive jig.

Is YOUR product bringing the top dollar? Can you meet the most rigid specifications? Do you get the most *PROFITABLE* yield from raw materials?

For detailed information, get in touch with The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

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SEARLE SLEEVES

"U. S." Searle Sleeves help roll up 4,000 tons an hour

To build a causeway, the contractor planned on excavating and placing over a million yards of fill a month by conveyor belt.

Trouble began when mud and sand built up to an almost concrete-hard finish on the return idlers. This accelerated cover wear, caused the belt to wander, also caused excessive belt stress—all of which would result in premature failure. Then a "U. S." Belting Engineer suggested patented U. S. Rubber Searle Sleeves on the return idlers. Over six hundred of these specially designed rubber sleeves were cemented to the 6"-diameter idlers. Build-up of mud and sand ceased and wandering of belt stopped. The sleeves gave fine performance, needed no maintenance, and moved 4,000 tons an hour.

• • •

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News of the Industry

Phoenix Cement Company To Operate Arizona Plant As American Cement Div.

Formation of the Phoenix Cement Company as a division of the American Cement Corporation was announced recently. The Arizona-operated division will produce cement at its new $16,000,000 plant, now under construction near Clarkdale.

In a release issued by Donald S. MacBride, president of American Cement, the names of officers of the Phoenix Cement Company were given as follows:

Ray R. Adams, Clarkdale, president; Frank N. Steadman, Phoenix, vice-president; and W. A. Warriner, Phoenix, assistant to the vice-president. All three have long been actively associated with the cement industry.

Mr. Adams has served as project manager for the firm's Clarkdale plant since construction began there early in 1958. Previously he had managed the Peerless Cement Company's plant at Port Huron, Mich.

Mr. Steadman also served on the staff of Peerless before his appointment to his present position.

Phoenix Cement Company, like the three other divisions of American Cement, will be operated as an autonomous and independent organization. Management and policy-making will originate locally in all phases of the operation. The first large contract undertaken by Phoenix is with the Department of Reclamation, to furnish 3,000,000 bbl. of cement for the construction of the Glen Canyon Dam in the northern part of Arizona.

Stockholders of Medusa Portland Cement Company recently approved a two-for-one split of common stock for shareholders of record January 5. Headquarters of the firm have been changed from Bay Bridge, Ohio, to Cleveland Heights, where company offices are located.

Officers of the Phoenix Cement Company, Arizona division of the American Cement Company — W. A. Warriner, assistant vice-president; Frank N. Steadman, vice-president; and Ray R. Adams, president.

N.S.A. Operators to Meet At Niagara Falls, Apr. 21-22

Plant operators of the National Slag Association will meet on April 21 and 22 at the Treadway Inn, Niagara Falls, N. Y., according to a release issued by E. W. Baumann, managing director of N.S.A.

Although details of the program have not been worked out, members will participate in a tour of slag plants and construction projects in the Buffalo area. On the first day they will be dinner guests of the Buffalo Slag Company, Inc. Reservations should be made with the Treadway Inn, and N.S.A. headquarters should be notified.

Coming Events

February 15-19, 1959—San Francisco. Annual meeting, American Institute of Mining, Metallurgical, and Petroleum Engineers.

February 16-19, 1959—New Orleans. 43rd annual convention, National Sand and Gravel Association; 29th annual convention, National Ready Mixed Concrete Association. Roosevelt Hotel.

February 23-27, 1959—Los Angeles. 55th annual convention, American Concrete Institute. Statler-Hilton Hotel.

March 2-9, 1959—Palm Beach. 51st annual convention, American Concrete Pipe Association. Palm Beach Biltmore.

April 6-8, 1959 — Hot Springs, Va. 51st annual convention, National Lime Association. The Homestead.

April 23-25, 1959—Houston. 5th Joint annual convention, Texas Aggregates Association and Texas Ready Mixed Concrete Association. Shamrock Hilton Hotel.

June 21-26, 1959—Atlantic City. Annual meeting, American Society for Testing Materials. Chalfonte-Haddon Hall.

L. L. Hank Elected Director—Five Promotions Announced For National Gypsum Staff

The election of Leonard L. Hank to the board of directors of National Gypsum Company and of three vice-presidents was announced recently.

The three new vice-presidents are Melvin F. Cerruti, dealer sales; Eugene W. Odenwaldt, manufacturing; and S. David Skinner, engineering.

Mr. Hank was promoted to vice-president, operations, for National Gypsum last October, succeeding the late Wells F. Anderson. He joined National Gypsum in 1946 at Kalamazoo, Mich. In 1950 he was promoted to production manager at National's headquarters in Buffalo. Subsequently he became general production manager for the company's gypsum, paper, and insulation board plants, and manufacturing vice-president in 1956.

Mr. Cerruti, vice-president in charge of dealer sales, is a 30-year National Gypsum veteran. He has served as New York City district manager, Eastern Division manager, and general sales manager.

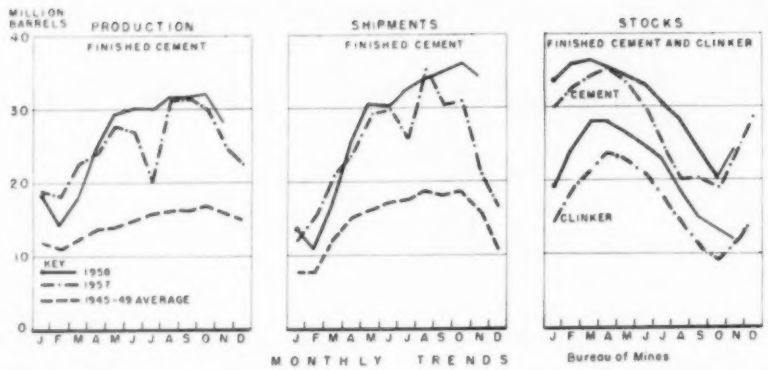
Mr. Odenwaldt succeeds Mr. Hank as vice-president in charge of manufacturing. He has been successively production manager for National Gypsum's rock wool insulation plants, head of the company's metal lath and insulation board plants, later of its asbestos-cement plants, and then general production manager in charge of all these installations.

Mr. Skinner, named to the new position of vice-president in charge of engineering, was previously director of engineering. He joined National Gypsum in 1939 at the New York City plant. During World War II he served at the Bluebonnet, Texas, Ordnance Plant which National Gypsum operated for the government.

The following promotions were also announced:

John G. Stapler, formerly production manager of the firm's insulation board, metal lath, and asbestos-cement plants, succeeds Mr. Odenwaldt as general production manager.

Maurice C. Crook, a veteran of the building material industry of more than 30 years, who has been assistant director of engineering since 1944, was named director of engineering, succeeding Mr. Skinner.



SUMMARY—Production of finished portland cement in November, 1958, as reported to the U. S. Bureau of Mines, totaled 28,031,000 bbl., an increase of 12 percent over November, 1957. Mill shipments in November, 1958, totaled 24,528,000 bbl., an increase of 18 percent from November, 1957. Stocks of 23,688,000 bbl., of finished portland cement on hand November 30, 1958, were 2 percent more than those on hand November 30, 1957. Clinker production during November, 1958, totaled 27,669,000 bbl., an increase of 2 percent over the November, 1957, figure.

PRODUCTION—One hundred and sixty-three (163) plants in 37 states and Puerto Rico reported a production of 28,031,000 bbl. of finished portland cement during November, 1958, compared with 25,014,000 bbl. in November, 1957.

Clinker production during the month of November, 1958, was 27,669,000, compared with 27,193,000 bbl. during the same month in 1957.

High-early-strength portland cement production in November, 1958, was 1,141,000 bbl., a decrease of 7 percent from the November, 1957, production.

Production of prepared masonry cement during November, 1958, of 1,399,000 bbl., increased 20 percent over the November, 1957, figure.

SHIPMENTS—Mill shipments of finished portland cement for November, 1958, totaled 24,528,000 bbl., while in November, 1957, 20,829,000 bbl. were shipped.

In November, 1958, shipments were higher in 21 districts and lower in 2 districts than in November, 1957. The greatest increases were in Texas, western Missouri-Nebraska-Oklahoma-Arkansas, Iowa, and Kansas districts.

Mill shipments of high-early-strength portland cement totaled 1,083,000 bbl. in November, 1958, an increase of 4 percent over the 1,039,000 bbl. shipped in November, 1957.

Mill shipments of prepared masonry cement in November, 1958, totaled 1,178,000 bbl. an increase of 34 percent over the 881,000 bbl. shipped in November, 1957. Nearly two thirds of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels of varying weights.

STOCKS—Mill stocks of 23,688,000 bbl. of finished portland cement were on hand November 30, 1958, an increase of 2 percent over the 23,187,000 bbl. on hand November 30, 1957. Stocks of clinker increased 5 percent from 11,326,000 bbl. on hand November 30, 1957, to 11,933,000 bbl. on hand November 30, 1958.

FIRST TEN MONTHS—For the January-October period of 1958, the volume of production of finished cement amounted to 287,729,000 bbl., compared with 275,415,000 bbl. in the same period of 1957. Total shipments for the first ten months of 1958 are reported as 290,417,000 bbl.; in 1957 (January-October period) the total shipments were 272,276,000 bbl.

L. L. Hank | M. F. Cerruti | E. W. Oldenwaldt | S. D. Skinner | M. C. Crook | J. G. Stapler

Bigger Equipment

Fast, powerful 6-yd. dragline reaches way out for a heaped bucket.

...The answer to higher production at lower net cost

The trend among producers everywhere has been a steady move to the use of bigger equipment in quarries and plants. Because the larger machines can work faster and produce more with reduced labor requirements, the cost per ton produced is substantially lower. Greater productivity cancels out the higher initial investment in a surprisingly short time.

Shovel prime producer. In the sand and gravel and crushed stone industries, the power shovel remains, today more than ever before, the primary producer. Your production rate depends upon it and unit costs will usually vary inversely with the hourly output of the shovel. As the shovel capacity grows larger, labor costs remain practically the same. After all, it takes the same operator to run a 5-yd. machine or a 1-yd. rig. Without increasing the labor cost, substantially greater tonnage can be moved. Generally speaking, the most modern and successful operators in this business today have discovered that in the long run, the most economical equipment is big equipment.

Big 3-yd. shovel has stamina to keep digging rock without letup.

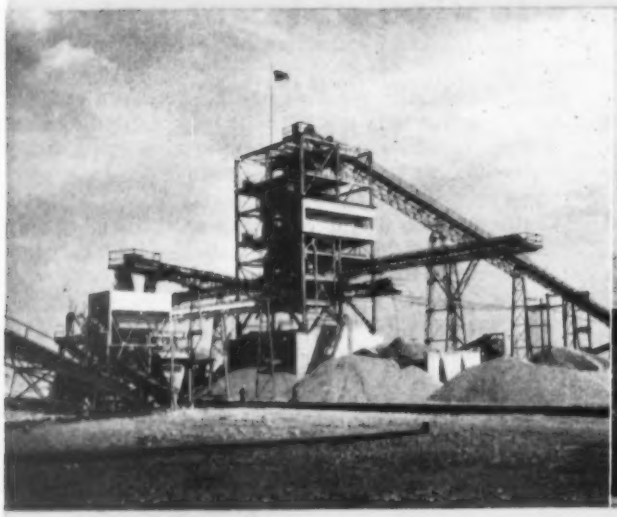
Longer working life. In rock or stone, nothing beats the trouble-free digging and loading ability of a big, rugged shovel in a 3-yd. or larger capacity. Powerful, fast shovels are built to take the rough punishment of rock digging for years on end without expensive breakdowns. Units built by the Manitowoc Engineering Corp., for instance, illustrate how the manufacturer *engineers* every component of his machine to meet the rigors of pit and quarry work. Manitowocs have reinforced, alloy steel dipper sticks; huge, heavy carbodies; extra-stable, wide-spread crawlers; powerful, independent chain crowds with a high speed retract; 3-stage torque converter power applications; simple design with "Power-Flo" drive using a minimum number of gears; long-life, alloy steel utilized at every point of greatest wear; and many other long-lasting parts to insure steady production with the least amount of attention and service.

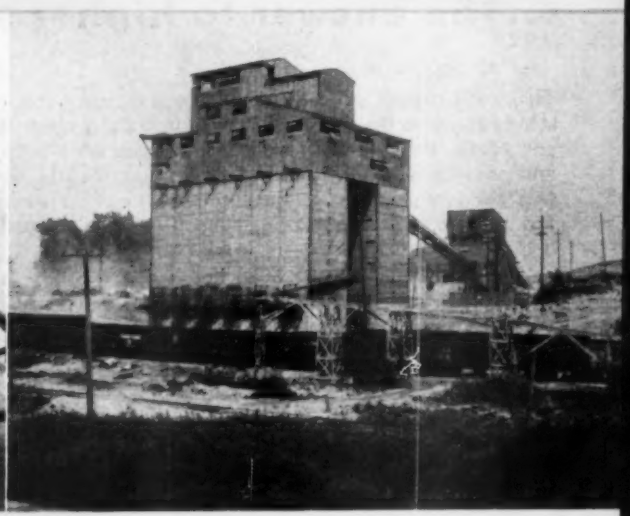
Get ready now to meet the stepped-up demands for cement and stone. Increase your pit output and raise your profit margin by switching to larger equipment soon. Modern, big-capacity excavators will give you a better chance to make a fair profit in the busy, highly competitive days ahead. To beat the competition, you'll want a hard-digging Manitowoc with the power, speed and reach to put you way ahead. Your Manitowoc distributor is the man to see . . . now! And ask him for a copy of the helpful, informative folder, "Manitowoc for more Profitable Production" . . . it contains details you'll want to know about the full line of Manitowoc units, ranging from 1-yd. to 5½-yd. in capacity. Manitowoc Engineering Corp., Manitowoc, Wisconsin. (A subsidiary of The Manitowoc Company, Inc.).

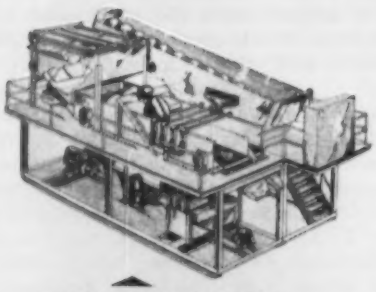
71 of the 100 Largest Use Eagle

HUNDREDS of small sand and gravel plants successfully use Eagle Equipment, but equally significant is the fact that seventy one of the one hundred largest producers use Eagle Equipment extensively. It is also significant that some of these producers were not among the top 100 at the time they started using Eagle Equipment.

The reasons for the overwhelming predominance of Eagle installations are obvious: Eagle pioneered washing and classifying equipment. Eagle has the broadest experience in the field by far. Eagle has the broadest line—water-scalping-classifying





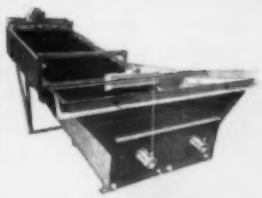


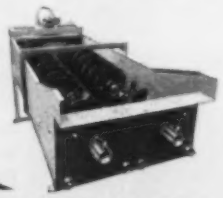
EAGLE HEAVY MEDIA SEPARATION PLANTS

Most efficient HMS plant on the market because it uses the patented OCC Separatory Vessel—provides fast, positive separation of sink and float material. Eagle Densifier gives positive recovery of heavy media. Made in 4 block sections, readily transported and erected at plant site. Capacities to meet customer needs.

EAGLE FINE MATERIAL WASHER-CLASSIFIER-DEHYDRATORS

For thorough washing and dewatering plus classifying of fine material to readily meet specifications. Water lubricated lower bearings, *new* totally enclosed gear drive in oil bath, 3-sided adjustable long overflow weir, larger settling area and feed control box. Way ahead in design and performance. Single Screw and Double Screw Units.



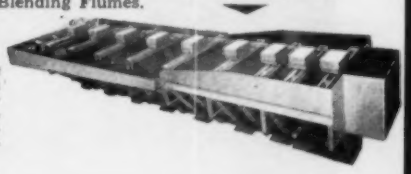


EAGLE COARSE MATERIAL WASHER - DEWATERERS

For thoroughly washing and dewatering coarse materials. Corrugated paddles in pool area open up and abrade material, screw flights in drainboard area give thorough dewatering action. Water lubricated marine type lower bearings. *New* totally enclosed gear drive in oil bath. Single Screw and Double Screw Units.

EAGLE WATER SCALPING-CLASSIFYING TANKS

Eagle pioneered and perfected. Provide (1) removal of excess water and silt, (2) classification of material and (3) retention of needed fines. For dry pit or dredging operations. Features Power-Operated Bleeder Valves, Metering "Splitter" Gates and Multi-Cell Collecting-Blending Flumes.



Sand and Gravel Producers Equipment

tanks, fine material units, coarse material units, log washers, HMS plants, equipment for special problems such as slate and coal removal. The most comprehensive, factory-trained sales and service organization.

If you are not presently using Eagle Equipment let us demonstrate what it is doing for sand and gravel producers in all 49 states, Canada and elsewhere. Whether yours is a single or multiple plant operation, Eagle Equipment can increase your efficiency, enable you to meet specifications and lower your costs. Send for Catalog. **Eagle Iron Works, Engineers and Manufacturers, 133 Holcomb Ave., Des Moines, Iowa.**

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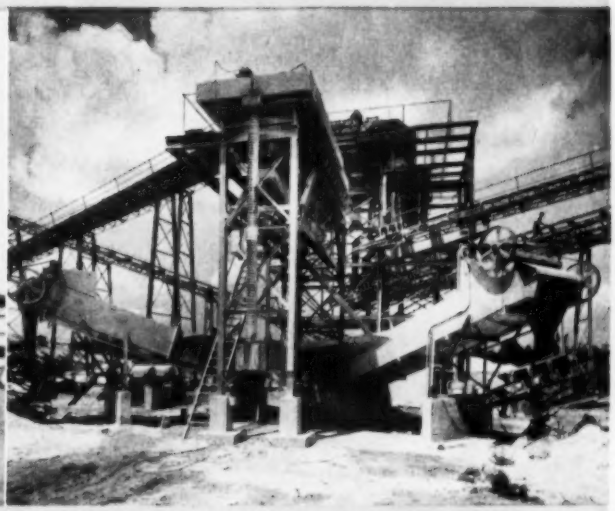
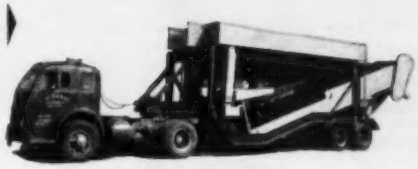
EAGLE IRON WORKS



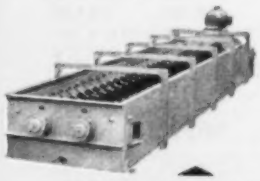
EAGLE PORTABLE SECTIONS

Complete fine material washing-classifying-dehydrating sections on wheels. For dry pit or dredging operations. Easy to move. Consists of Water Scalping-Classifying Tank and two Single Screw Fine Material Washers. Same proven equipment as Stationary Sections.



EAGLE "SWINTEK" DREDGING LADDERS

Eliminate pumping delays and increase production. Traveling chain screens nozzle; keeps out boulders and debris which clog lines and cause pump damage. Cutter bars agitate deposit, increase intake of solids, cut through clay strata and cut ladder clearance. Permit recovery from greater depths. Can be installed on any present dredge or on new Eagle all-steel dredge.

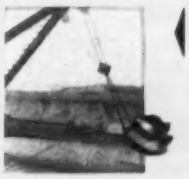


EAGLE STABILIZED ROAD BASE MIXERS

For plant mixing of stabilized road base material such as fine and/or coarse aggregate with required additives, aggregate with clay or crushed stone with crusher dust. Controlled volume of water added simultaneously. Described in Bulletin 1258.

EAGLE LOG WASHERS

Eagle Log Washers do superior job of washing gravel, crushed stone or ore with interlocking double tubular steel log shafts and renewable Ni-Hard paddle shoes *New* totally enclosed, oil bath. Gear drive handles large horsepowers for severe scrubbing.



EAGLE CUTTERHEAD DREDGING LADDERS

For underwater deposits where sand does not cave readily. Revolving cutterhead breaks up compacted masses . . . enables dredging to a grade line. Drive shaft runs from cutterhead to power source above water. Can be installed on any dredge.

Reigeluth Named President, Worthen Vice-Chairman Of New Haven Trap Rock

Robert S. Reigeluth has been named president of the New Haven Trap Rock Company, and Albert L. Worthen becomes vice-chairman, according to a company announcement. Mr. Worthen was formerly president, and Mr. Reigeluth executive vice-president and treasurer.

R. S. Reigeluth

Since joining the sales department of the company in 1946, Mr. Reigeluth has served as assistant secretary, assistant treasurer, secretary and treasurer, and most recently executive vice-president. He is also a director of New Haven Trap Rock.

Albert L. Worthen

Mr. Worthen, who moved up to vice-chairman, entered the crushed stone business in the fall of 1911 as a construction engineer for the Connecticut Trap Rock Company. He headed this company at the time it merged with the New Haven Trap Rock Company in 1935. He served as president of the National Crushed Stone Association for three years and was a member of the executive committee and board of directors for many years.

New A.S.T.M. Compilation Issued on Standards For Aggregates, Concrete

A new compilation sponsored by A.S.T.M. Committee C-9 on Concrete and Concrete Aggregates and Committee D-4 on Road and Paving Materials includes all of the standards prepared by Committee C-9, but only those for aggregates and other selected highway materials developed by Committee D-4. In addition, it contains pertinent specifications for cement which are under the jurisdiction of Committee C-1 on Cement.

The book contains 101 standard specifications; methods of test; recommended practices; and definitions of terms for mineral aggregates, concrete, concrete curing materials, expansion joint fillers, and miscellaneous related specifications. References are given for specifications on concrete reinforcing steel, paving block and brick, and bituminous and nonbituminous road materials. Of the included standards, 46 are new or revised.

This publication will be useful to producers and consumers of mineral aggregates, concrete, and highway materials, to highway engineers, specification writers, testing and inspection personnel, and research and engineering institutions.

Copies may be obtained from A.S.T.M. headquarters, 1916 Race Street, Philadelphia 3, Pa., at $4.75.

October Lime Sales Climb To More than 770,000 Tons

Domestic sales of open-market lime in October, 1958, (773,175 short tons) increased in comparison with the previous month's output, according to reports made by producers to the U. S. Bureau of Mines.

Construction, refractory, chemical, and other industrial lime increased; a slight decrease was noted in agricultural lime. (Note the accompanying table.)

Flintkote Company, East Rutherford, N. J., has announced plans for the construction of a new plant at Salt Lake City, Utah, for the production of Miracle Lime. The plant is expected to cost over $1,000,000.

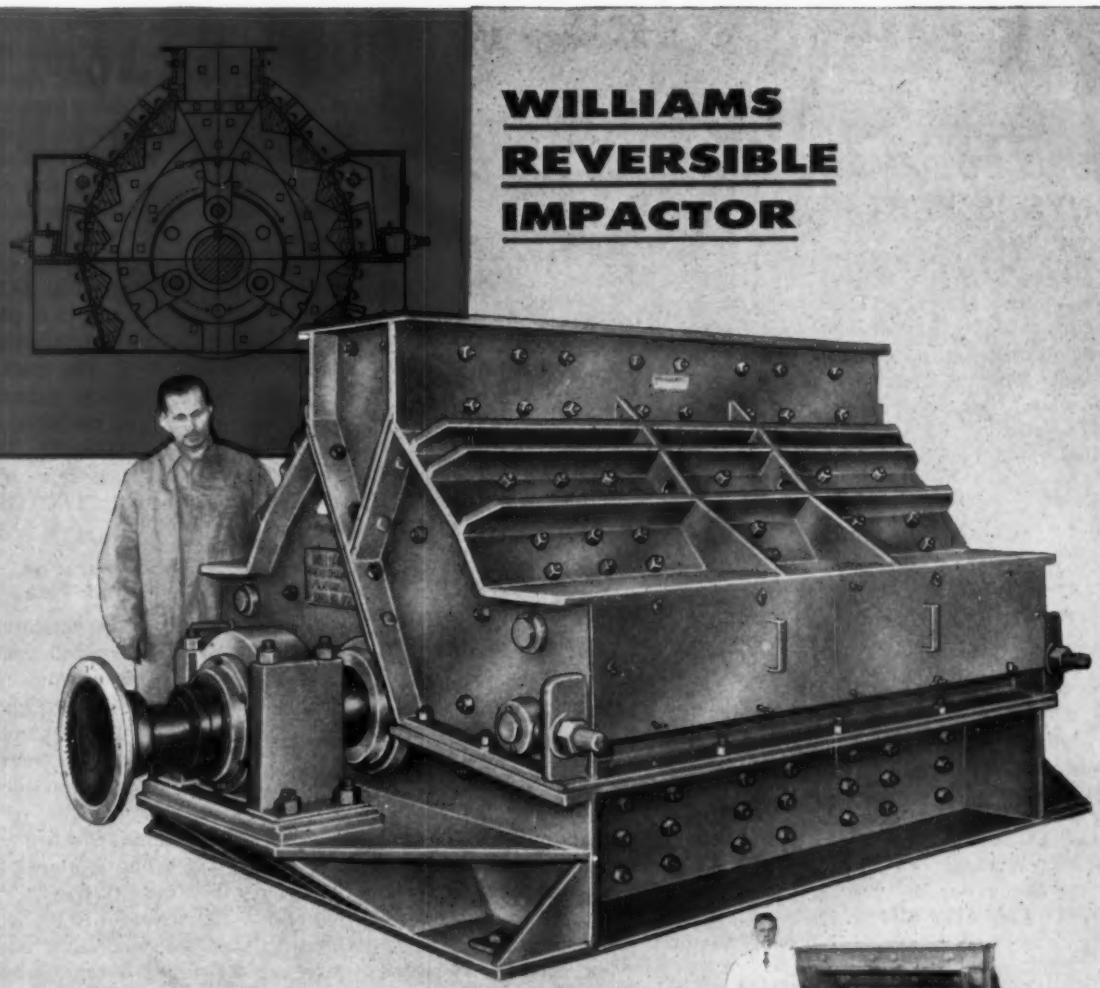
Lime Sold by Producers[1] in the United States, in Specified Periods of 1957-58, by Types and Major Uses in Short Tons

	September	October		January-October	
	1958	1958	1957	1958	1957
By types:					
Quicklime	516,397	598,679	595,343	4,734,176	6,057,943
Hydrated lime	171,024	174,496	166,655	1,590,564	1,591,880
Total[2]	687,421	773,175	761,998	6,324,740	7,649,823
By uses:					
Agricultural:					
Quicklime	7,958	4,953	10,264	46,380	68,587
Hydrated lime	10,051	8,040	9,074	106,007	124,791
Total	18,009	12,993	19,338	152,387	193,378
Construction:					
Quicklime	12,297	12,242	12,473	111,450	150,895
Hydrated lime	85,640	86,417	83,751	776,229	773,988
Total	97,937	98,659	96,224	887,679	924,883
Chemical and other industrial:					
Quicklime	349,262	376,027	390,856	3,234,879	3,863,547
Hydrated lime	75,333	80,039	73,830	708,328	693,101
Total	424,595	456,066	464,686	3,943,207	4,556,485
Refractory (dead-burned dolomite)	146,880	205,457	181,750	1,341,467	1,974,914

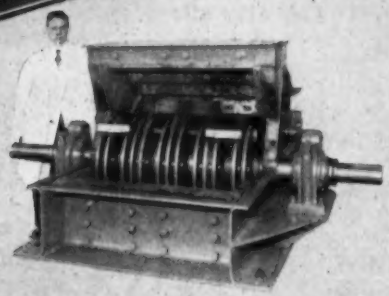
[1]Also includes a small quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

[2]Approximately 60 percent of lime produced is high-calcium and 40 percent high-magnesium.

WILLIAMS REVERSIBLE IMPACTOR



- 100% Impact Reduction
- No Friction Or Abrasion
- Unobstructed Discharge
- Less Upkeep Expense

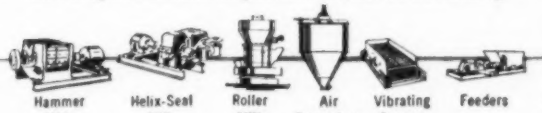


Internal view showing manganese steel impact blocks, hammers and liners. Rugged, heavy steel plate construction. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.

Unequalled For Secondary Grinding

Reduces limestone and material of similar hardness to 1½", ¾" or smaller. Properly adjusted, the Williams Impactor makes excellent material with the proper percentage of fines for road base course. Unusually low upkeep expense as reduction is 100% by impact. Material is fed to enter between the hammers and is thrown against the impact blocks setting up a repeated ricochet action which accomplishes the reduction. Adjustable impact blocks adjust for wear. A reversing switch on motor permits rotating hammers in either direction, to the left today and to the right tomorrow, thereby giving double hammer life. No grates are used. Entire bottom is open permitting unobstructed discharge of crushed material and less wear and tear. A size for every job. Let us tell you about one for your use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 St. Louis Avenue — St. Louis 6, Mo.



WILLIAMS
CRUSHERS · GRINDERS · SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World

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WHICH 3 OF THESE USED EQUIPMENT BUYS IS BEST FOR YOU?

Only your Caterpillar Dealer offers you these three protected buys on used equipment. Which is best? That depends on how you want to use a unit and what you want to pay. Whatever you want, you'll find it in his lot.

BONDED BUY

1 A **"BONDED BUY"** on used Cat-built equipment is your safest buy. A bonded guarantee, up to $10,000, of satisfactory performance on *all* parts is given when you purchase a "Bonded Buy" used Cat-built machine.

2 A **"CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 A **"BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

You *know* what you're buying from your Caterpillar Dealer. You'll find him listed in the Yellow Pages. Visit his Used Equipment headquarters for the best buys in the market!

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BEST BUYS IN NEW AND USED EQUIPMENT

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S. B. Webb Jr.

Webb of Marquette Named To Operations Director Post

Samuel B. Webb Jr., formerly assistant director, has been promoted to the post of director of operations of Marquette Cement Manufacturing Company. The announcement was made by Frank Moyle, Marquette vice-president.

Mr. Webb joined the company in 1950 as assistant chemist at its Oglesby, Ill., plant. A year later he was appointed chief chemist at the Brandon, Miss., plant, and superintendent in 1954. In 1957 he was transferred to the company headquarters in Chicago as assistant to J. H. Howe, director of operations.

Canadian Minerals in 1958 Exceed $2,000,000,000 in Value

Although the value of minerals produced in Canada during 1958 exceeded $2,000,000,000, it did not reach the peak established in 1957, according to a preliminary estimate prepared by the Dominion Bureau of Statistics at Ottawa. The decline was about 3 percent. Downward trends were shown in some of the base metals, but counterbalancing these decreases was an increase in uranium. Asbestos shipments were down by $7,000,000.

Nonmetallic minerals decreased in value to $158,000,000 in 1958, compared with $169,000,000 in 1957. Although there were some new producers of asbestos, the total quantity of asbestos shipped was 100,000 tons less than in 1957. Gypsum shipments were about the same as in the last few years. About $2,000,000 worth of lithia were exported for further processing. About 200,000 tons of nepheline syenite were shipped to the glass and ceramic industries. Salt shipments were valued at $15,500,000.

Clay products, such as brick, tile, pottery, etc., were valued at $42,600,000, an increase of 18.6 percent. Cement shipments levelled off above 6,000,000 tons. The market for lime in the chemical industry improved, thus raising the value of shipments to over $20,000,000. The combined value of stone, sand, and gravel amounted to $155,000,000.

Campbell Sons' Corporation Establishes Retirement Plan

A retirement plan for employees of the Harry T. Campbell Sons' Corporation in which the company pays the entire cost of providing benefits, with no cost to participating employees, has been announced by Bruce S. Campbell Jr., president of the Towson, Md., firm.

The plan became effective on January 1, 1959, and is known as the Harry T. Campbell Sons' Corporation Employees' Retirement Plan. It represents the latest addition to the firm's comprehensive program of employee benefits.

All regular full-time employees who are 30 years of age and over will be covered. Those under the specified age requirement will become participants upon reaching that age. All new employees between the ages of 30 and 55, hired on a full-time basis after January 1, 1959, will be eligible.

The plan will be administered by a retirement committee of five persons appointed by the board of directors of the Campbell company. Funds will be held exclusively for the benefit of the employee participants covered by the plan.

Normal retirement date under the plan is age 65, with provisions for late and early retirement, as well as for disability retirement.

ROBERT J. STUART has been promoted to sales manager of the Pittsburgh division of the Medusa Portland Cement Company.

NEW CHEVROLET 4-WHEEL DRIVE ENABLES YOU TO HAUL WHERE YOU COULDN'T BEFORE!

Model 3684 Fleetside Pickup

Chevrolet's new 4-wheel drive really digs in and does it . . . enables you to haul through deep mud, snow, swampy areas and up towering grades. With up to twice the traction, wheels are able to grab hold and go!

Here's the latest thing in 4-wheel drives! A rubber-mounted power divider with precision-engineered front axle distributes power evenly to front and rear axles. And when the going is extremely difficult, it directs power to whichever axle is getting the best traction. Result: Your load goes through, whether the road does or not!

EASY SINGLE-STICK CONTROL

Shifting between 2-wheel drive and 4-wheel drive can be done whether the truck is stopped or moving. Lever has these 4 positions: (a) 4-wheel drive, (b) neutral, (c) 2-wheel direct, (d) 4-wheel direct.

CHEVROLET 4-WHEEL DRIVE SUITS MANY MODELS

There are Chevrolet 4-wheel drive *pickups* for ploughing, grading, snow removal jobs, and others . . . *panels* for surveying, delivery, and construction tasks . . . *Suburban Carryalls* for sportsmen and tough cargo-and-passenger-carrying jobs . . . *stakes* for work that calls for heavy back-country hauling . . . and *chassis-cabs* for a broad range of special applications!

PROVIDES POWER FOR SPECIAL EQUIPMENT OF MANY KINDS

With *four* power takeoff outlets, Chevrolet 4-wheel drive can be used to operate saws, winches, generators, pneumatic hammers, post-hole diggers, back hoes, and many more!

Get complete information on new Chevrolet 4-wheel drive!

MAIL THIS COUPON TO COMMERCIAL & TRUCK DEPARTMENT, CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____ (PQ-2)

See your nearby Chevrolet dealer about versatile 4-wheel drive in

CHEVROLET TASK·FORCE 59 TRUCKS

CHEVROLET

Enter 33 on card, page 123 ➔

Sure footing, more firm because of the twisted bar surface of this grating, provides additional safety for this workman, who is making a separator adjustment from a second level position. Some of these walks and stairways are 50 ft. high around the cement processing area.

New Safety Grating Used By Peerless Cement Co.

Open flooring and stairways increase safety and visibility and reduce maintenance around a mechanical separator at one of the two Detroit plants of Peerless Cement Company Division, American Cement Corporation.

This plant installation employed 2,590 sq. ft. of Blaw-Knox grating to increase visibility and supplement lighting facilities around the tank area and reduced time-consuming cleaning maintenance.

Peerless, which also operates a plant in Port Huron, Mich., is one of the oldest cement producers in the Midwest. Total annual cement production is approximately 6,500,000 bbl.

AMERICA'S
GREAT
VOLUNTEER
TASK FORCE

In 1959, the Red Cross Nursing Service will celebrate its 50th anniversary as a volunteer organization created to provide emergency relief whenever needed. Some 58,000 professional nurses serve as volunteers for community needs through Red Cross chapters, and more than 2,000,000 volunteers in all capacities staff the Red Cross offices across the nation.

The American Red Cross fund campaign will begin soliciting contributions in its annual drive in March. Our generous contributions will help to ensure the implementation of the organization's motto, "On the job when you need it most."

• • •

Ideal Cement Company, Denver, has contracted with Leeds and Northrup Company, Philadelphia, Pa., for complete instrumentation of a kiln now being installed at Ideal's new Ada, Okla., plant.

N.S.G.A. Circulates Ad Reprint To Spur Land Rehabilitation

A highway built to relieve traffic congestion in Boston has had some dramatic side effects. Industrial development became possible with the use of land which was formerly inaccessible, and job opportunities were greatly improved. A former gravel pit in the suburb of Needham, Mass., was developed into New England's first garden-type industrial center as a result of the improved transportation and communication. Twenty-eight leading American industries have located in this area and the annual taxes of Needham have jumped from $3,320 to $325,000 since 1952.

The Caterpillar Company, manufacturers of diesel engines, tractors, motor graders, earthmoving equipment, told this story of land rehabilitation in a full-page advertisement which appeared recently in several national magazines. The National Sand and Gravel Association has had reprints made of the advertisement which are available to its members for the purpose of encouraging producers to recognize their community obligation. N.S.G.A. leadership feels strongly that land rehabilitation programs should be planned by all nonmetals producers.

Needham, Mass., formerly site of a gravel pit yielding only $3,320 annually in taxes now brings in $325,000. The development of a garden-type industrial center here came about as a result of better transportation provided by a new highway (foreground).

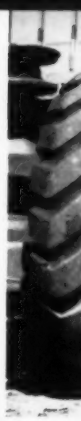
Smileage!

Opens up new opportunities

for tire savings

WITH THE NEWEST, BIGGEST OFF-THE-ROAD TIRE ON THE MARKET TODAY!

This scraper is one of a fleet operated by Ball and Simpson, contractors of Berkeley, California. The equipment works 16 hours a day hauling 25-ton loads of dirt and rock for a new superhighway. The company keeps this project on schedule by using B.F.Goodrich Rock Service tires. The report: even under tire-killing work conditions, Rock Service tires cut delays to a minimum—give as many as 2,000 hours' service before retreading.



B.F.Goodrich

Rock Service prevents unnecessary tire failures!

THE new B.F.Goodrich Rock Service —unlike an ordinary tire—is built to its inflated shape. This FLEX-RITE construction permits *uniform* flexing — no localized stresses that often cause unnecessary tire failures!

Look at the husky double chevron tread. The cleats bite in to give maximum traction and skid resistance in forward or reverse. Under the tread is the B.F.Goodrich FLEX-RITE NYLON cord body. It withstands double the impact of ordinary materials, resists heat blowouts and flex breaks. The B.F.Goodrich FLEX-RITE NYLON body outwears even the extra-thick Rock Service tread, can be retreaded over and over! No wonder the B.F.Goodrich Rock Service tire gives longer service in mine, quarry or dirt-moving jobs!

Western Contracting Corp. operates 2,000 vehicles to build highways, dams and air bases all over the country. Here the job is earth moving for a new runway at Wright-Patterson Air Force Base, Fairborn, Ohio. B.F.Goodrich Rock Service tires have substantially increased hours of service and substantially reduced delays due to tire failure (saving between $300 and $600 per hour, the company reports).

Call the district office nearest you for B.F.Goodrich tires and tire service

Albany, New York 4-7181	Fargo, North Dakota . . . . . AD. 2-7462	New York, New York. . . . . OR. 9-0330
Atlanta, Georgia . . . . . DR. 8-4561	Grand Rapids, Michigan . . . CH. 1-2609	Oklahoma City, Oklahoma . . JA. 5-1587
Baltimore, Maryland . . . . . BE. 5-6705	Harrisburg, Pennsylvania . . . CE. 4-5974	Omaha, Nebraska . . . . . PL. 8133
Birmingham, Alabama . . . . FA. 2-0364	Hartford, Connecticut. . . . . JA. 5-1186	Philadelphia, Pennsylvania . . JE. 5-5800
Needham Heights, Mass. . . . HI. 4-6100	Houston, Texas . . . . . CA. 7-5228	Pittsburgh, Pennsylvania . . . HI. 1-5200
Buffalo, New York . . . . . RI. 1258	Indianapolis, Indiana . . . . . ME. 7-2508	Portland, Oregon. . . . . CA. 6-3621
Charlotte, North Carolina . . . EX. 9-5621	Jacksonville, Florida . . . . . EL. 6-4167	Richmond, Virginia. . . . . EL. 5-6573
Chicago, Illinois . . . . . ES. 8-8800	Kansas City, Kansas . . . . . MA. 1-4400	St. Louis, Missouri. . . . . PR. 3-2600
Cincinnati, Ohio . . . . . BR. 1-7800	Los Angeles, California . . . . RA. 3-6692	Salt Lake City, Utah . . . . . DA. 2-2405
Cleveland, Ohio . . . . . PR. 1-0827	Memphis, Tennessee. . . . . WH. 8-6761	San Antonio, Texas. . . . . CA. 7-7543
Columbus, Ohio . . . . . AM. 8-8631	Milwaukee, Wisconsin . . . . DI. 4-5104	San Francisco, California . . . AT. 2-9620
Dallas, Texas . . . . . RI. 1-5601	Minneapolis, Minnesota. . . . LI. 5-2521	Seattle, Washington . . . . . MU. 2-4300
Denver, Colorado . . . . . TA. 5-1267	Newark, New Jersey . . . . . MA. 3-3317	Wichita, Kansas . . . . . HO. 4-6389
Detroit, Michigan . . . . . CR. 8-7000	New Orleans, Louisiana. . . . VE. 3-7231	

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

Enter the B.F.Goodrich Truck Tire Mileage Contest. You can win a Thunderbird, or Corvette, or one of 310 other prizes. See your B.F.Goodrich dealer today for entry blanks.

B.F.Goodrich *truck tires*

© The B. F. Goodrich Company

Oil Field Chemical Used To Control Seeping Water In Cavern, Mine Shafts

The problem of controlling water seepage in a butane storage cavern and in salt mine shafts was solved recently by the use of a chemical first used to reduce water intrusion in air drilled wells.

The chemical, a polymeric water gel, is expected to prove useful in general mining operations. Marketed by Halliburton Oil Well Cementing Company under the name of Hydro-Lok "PWG," this gel works by penetrating the capillaries of the true permeability of a water-bearing formation. Its initial viscosity is almost as low as that of water, which aids its entry into a formation.

The new application for the water-sealing agent stems from a problem encountered by Sun Oil Company during the excavation of the nation's first butane storage cavern in granite at its Marcus Hook, Pa., refinery. The man-made cavern, built to hold 250,000 bbl. of butane upon completion, was producing a small amount of water from two fault zones and seepage from many small fissures.

Conventional grouting materials and methods did not halt the troublesome flows; cement slurry could not be forced into the relatively tight cracks and crevices in the gneiss-type rock.

The problem was referred to Sun Oil's Dallas research laboratory. Researchers there suggested that the Halliburton water control materials —one of which is polymeric water gel—might be the answer. A conference was arranged among Sun Oil personnel, representatives of Fenix & Scisson, Inc. (general contractor for the excavation), and Halliburton chemical engineers. At the meeting it was agreed that the gel would be tested on a trial basis.

A Halliburton field service crew from the company's Indiana, Pa., and Charleston, W. Va., locations—plus a chemical engineer from Duncan, Okla., headquarters—went to Marcus Hook for the experimental treatments. After a few applications the idea was proved to be practical and the company approved the completion of the project.

Sealing the water flows in the Sun Oil Company's new ground storage cavern at Marcus Hook, Pa. Polymeric water gel and resin cement were injected into parts of the roof and walls of the granite cavern.

The gel and a special resin cement were used for the treatments. The cement was employed as a bulking agent when spaces were large enough to require filling prior to sealing. The two materials were mixed in batches within the cavern, 306 ft. below the surface. Holes 6 to 32 ft. deep were drilled to intersect the water-bearing fissures. Packers were then set in the holes, and the water control agents were squeezed in and held under pressure. Injection pressures ranged from 400 to 1,200 p.s.i. Setting time of the gel was adjusted to vary from 8 minutes to 1 hour.

After 33 working days, more than 95 percent of the water seepage had been stopped. This reduced the intrusion to a measured rate of less than ½ g.p.m. Some 600 treatments were made, varying from 3 to 800 gal. each. A total of 7,946 gal. of gel and 736 gal. of resin cement were consumed.

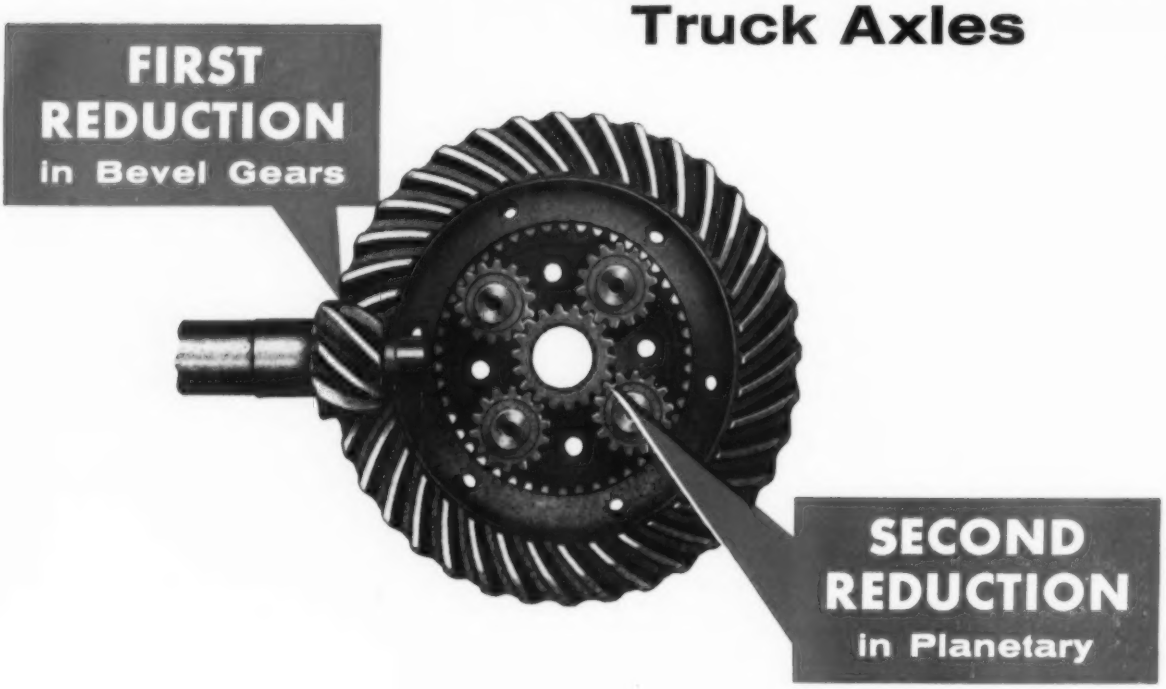
The successful use of the gel at the butane storage cavern was preceded by an application more nearly resembling oil field drilling. Two large shafts in the Morton Salt Company's Fairport Harbor mine at Painesville, Ohio, were dug through a sandstone formation producing gas at 700 p.s.i. and flowing a very salty brine. Several gel treatments corrected this condition and left the shafts completely dry and free of gas.

Our Cover Picture

Typical of the diversification of the nonmetallic minerals industries is the Sayre & Fisher organization, whose industrial sand plant at Sayreville, N.J., is pictured on our front cover this month. A long established producer of lightweight aggregates, commercial clay, and brick, the company recently completed an expansion of its original sand plant at this location to the interesting 125-t.p.h. facility shown here. Fed via pipeline from a 10-in. hydraulic dredge, the plant itself consists of a screen on which everything above ¼ in. is separated from the flow to a following trio of screw classifiers in which a wide variety of sands and blends of these materials are produced.

R. W. Bowen, formerly general superintendent of Marble Cliff Quarries Company, has been elected to the board of directors to fill the unexpired term of the late E. J. Kauffman. Mr. Bowen has been with the firm since 1919.

A New Concept in Double Reduction Truck Axles



Eaton Planetary Double Reduction

Gives You these Important Benefits!

Save Weight—Size for size, Eaton PDR Axles weigh less than conventional herringbone or spur gear axles, permit truckers to haul more legal payload.

Last Longer—In Eaton PDR Axles, gear tooth loads are equally distributed over four rugged "planet" gears; stress and wear are reduced, resulting in materially longer axle life. Eaton's forced-flow lubricating system provides positive lubrication to all moving parts, even at slowest vehicle speeds—a feature not available in other double reduction axles.

Cost Less to Maintain—When and if repairs are necessary, parts are readily available—most of them interchangeable with other Eaton Axles. Simple construction—similar to the famous Eaton 2-Speed Axle, with which all truck service men are familiar—holds maintenance labor to a minimum.

Previously, double-reduction axles have been available only in the extra heavy-duty sizes. Eaton PDR Axles are available in a wide range of sizes—the last word in equipment to meet the demands of today's hauling conditions. By actual comparison they cost less to buy, less to maintain. They have established outstanding performance records in all types of heavy-duty operation.

EATON

Ask your Truck Dealer for Complete Information about Eaton PDR Axles

EATON

AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

W. F. Wise

W. F. Wise of S. W. Stone, Past-President of N.C.S.A., Succumbs in Dallas

W. F. Wise, president of the Southwest Stone Company, Dallas, Tex., and a past-president of the National Crushed Stone Company, died on January 19 in Dallas.

Mr. Wise served as a director of N.C.S.A. for 32 years. He was president of the Association in 1929 and 1930. From 1944 through 1953 he was a member of the executive committee; and he was a regional vice-president in 1928, 1941, and 1944.

Cleveland Quarries Company Installs Mobile Handling Units

Some phases of quarrying have been changed but little in hundreds of years. However, at South Amherst and Birmingham, Ohio, Cleveland Quarries Company, an outstanding and long-established producer of special stone materials, aggregates, riprap, and building stone, have made a significant departure from certain traditional methods.

Mobile mechanization has superseded older, less efficient methods in some primary phases of the operation including raising stone from the quarry floor, stripping overburden, loading breakwater blocks (as seen in the accompanying photograph), and loading aggregates.

Stationary guy derricks, long used to remove large blocks from the quarries, have been supplanted by a self-propelled Lorain 424 rubber-tired crane. Two other Lorain units, one a 1½-cu. yd. crawler-mounted shovel-crane and the other a ¾-cu. yd. machine of the same type, are used for handling the large blocks or loading aggregate from the crushing plant. A fourth shovel is utilized for maintenance.

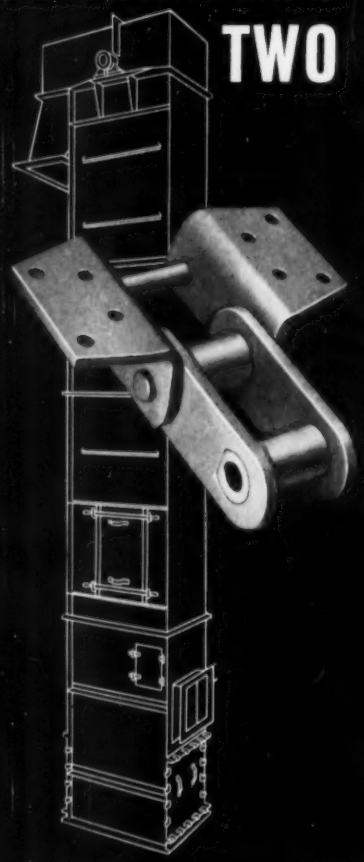
A special product of the crushing plant is a pea-sized material that is hauled to a nearby company mill for use in making a silica mix emplacement patching material for foundries.

Cost-wise, the mobility of the equipment has resulted in savings in one periodic operation (moving stationary derricks) of several thousand dollars for each move. In addition, manpower savings are realized through the reduction of the number of men required for various work gangs.

One of Cleveland Quarries Company's new mobile units is shown here loading 3-ton breakwater blocks for truck transport to a dam construction project near Akron, Ohio.

Another PLUS value..

THIS ONE OUTPERFORMS TWO



It's proved in actual performance...in many applications a single strand of Rex Chabelco Steel Elevator Chain is being used to replace double strands of ordinary chains. Here's why:
• *Largest working bearing areas for long life* • *Accurate size control and fits for maximum fatigue resistance* • *Precision-made chain parts for smooth sprocket action...less wear on chain and sprockets.*

See your Rex Distributor or mail the coupon.

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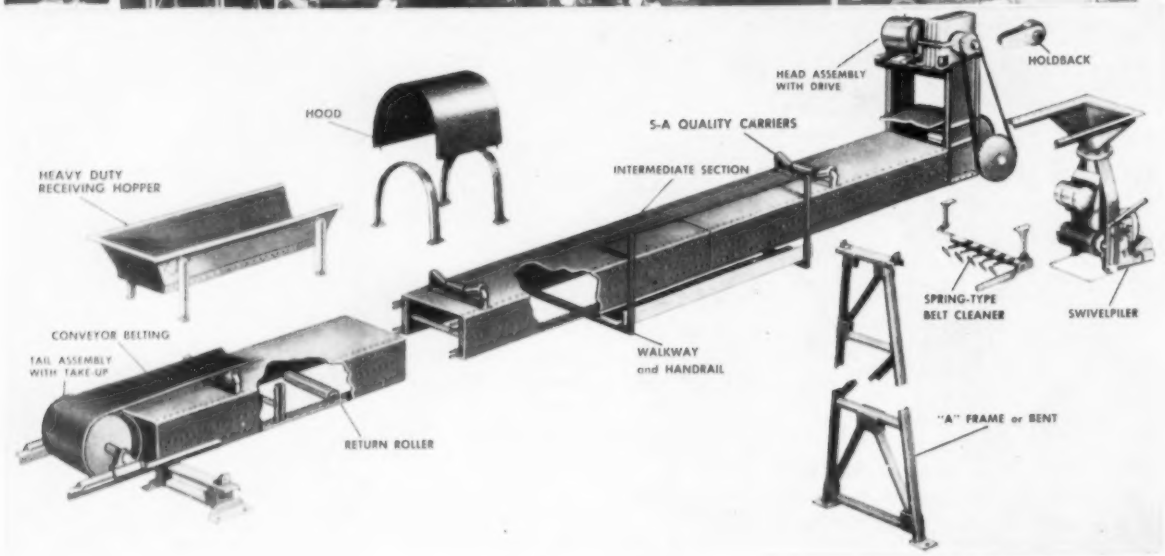

STEPHENS-ADAMSON

SECTIONAL BELT CONVEYOR

Here's a "do it yourself" conveyor that not only provides for fast, simple on-the-job erection but combines quality conveyor components and features provided in no other pre-engineered conveyor. Exclusive Bent Plate Decking assures easy erection or alteration and provides protection for return run of belt. Four high-strength bolts fasten head assembly . . . eight bolts join intermediate sections . . . and six bolts connect tail assembly — for simplest installation ever. Check features at right.

- S-A CURVE CROWN® Pulleys — Revolutionary new crown provides greater belt training effect while minimizing belt stretch and wear. New SQUEEZELOCK® Hub provides full gripping power — eliminates keyways.
- S-A Quality Carriers — Precision ball bearing carrier rollers (4" or 5") assure smooth, trouble-free performance. Roller bearing carriers optional.
- SEALMASTER® Self-Aligning Ball Bearing Units — Performance proven in countless conveyor installations.
- S-A SACO® Speed Reducer — Rugged, compact, quiet unit . . . famous for dependability. Shaft mounted reducers optional.
- S-A Spring-Type Belt Cleaner — Wipes belt clean of wet or dry materials. Simple to install, adjustable, saves belt, eliminates clean-up maintenance.
- S-A Holdback — Easily mounted on headshaft to prevent belt reversal Protects equipment and personnel.
- S-A SWIVELPILER® — Extend reach of conveyors tenfold with powerful centrifugal thrower unit.

AVAILABLE IN 18", 20", 24", 30" and 36" WIDTH CONVEYORS—DELIVERED FROM STOCK.

WRITE FOR BULLETIN 458

S-A
ENGINEERED BULK HANDLING SYSTEMS
STANDARD MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERICO® BEARINGS & ROD ENDS

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 20 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

● First shipment made from new multimillion-dollar Arkansas Cement Corporation plant near Foreman, Ark. (See January, 1959, issue, PIT AND QUARRY, p. 23.) The workman is checking off several of the first rail cars as they are loaded from concrete storage silos (right). Arkansas Cement has a four-state market.

World's Biggest Ore Scrubber Sold to African Processor

Conrad Stork-Haarlem, a partner of I. H. C. Holland, builders of ore dredges in the Netherlands has purchased the world's largest rotary ore scrubber for cleaning phospates—more than 35 ft. long and 11½ ft. in diameter—for the Senephos Co., Senegal, French West Africa. The transaction was made through Lindeteves, Inc., New York, and Emissa, French distributor and licensee for Allis-Chalmers International.

The scrubber, to be delivered this spring, will constitute the major component of a floating phosphate plant and will remove clay and slimes from approximately 400 t.p.h. (metric) of 20-in. by 0 phosphate ore feed.

Equipped with flame-hardened Lorain liners, the scrubber will have a relatively high machine capacity despite its weight of only 370,000 lb. Eight-in. high cast chrome-molybdenum alloy lifters in the main section of the shell and in the 5 ft. 7 in. discharge cone will form a specially designed spiral to propel scrubbed product from the machine.

Baker of National Gypsum Sees Production High in '59

Melvin H. Baker, board chairman of the National Gypsum Company, has predicted that his company's 1959 sales will register an 11 percent increase over the record 1958 total, which was close to $162,000,000, and set a new high of about $180,000,000. Estimated earnings were put at $15,900,000.

"Next year promises to be the greatest building year in history, with total construction volume passing the $50,000,000,000 mark for the first time," Mr. Baker stated.

National Gypsum's new products plant at Waukegan, Ill., is expected to be in operation by June. The gypsum quarry at Tawas City, Mich., which began limited production last year, will supply ore for the Waukegan plant and also for a facility to be built at Lorain, Ohio.

Arkansas Cement Corp. Plant Dedicated Officially Jan. 21

The official opening of the Arkansas Cement Corporation's new multimillion-dollar plant at Foreman, Ark., was held January 21. Governor Orval E. Faubus was the principal speaker at the ceremonies, which were attended by approximately 2,000 persons.

Full cement production at the plant began in December. The plant's rated capacity is 1,400,000 bbl. annually.

Pelican State Lime Corporation, a new firm, is building a $250,000 lime plant, to be located near Morgan City at Englewood, La. Agricultural and commercial lime will be produced and sold from the plant. Production is expected to begin in March. Owners of the new concern are Anthony and John Quarisco and R. A. Verret Jr.

Another PLUS value...

Stops
HOLDUPS
in your production

Want continuous production...to cut installation costs? Investigate the advantages of Rex Segmental Rim Sprockets and Traction Wheels. Tough, long-lasting special cast steel rims bolt simply to either split or solid hub body. When, after long service life, replacement is required, all you do is replace the worn rim...the hub body remains on the shaft. See your Rex Distributor or mail the coupon.

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Whizzer AIR SEPARATION

Available in sizes up to 18′ diameter

RAYMOND Double Whizzer Air Separator

The star performance of Raymond Whizzer Separators is due to their advanced design, as described in the new Bulletin #76. Write for your copy today.

Exclusive new features in the latest model Raymond Mechanical Air Separator give the extra efficiency you need for meeting today's stiff specifications at consistent low cost.

It does an excellent job in the non-metallics field for the uniform fine separation of cement, lime, gypsum and similar materials.

When operated in closed circuit with a grinding mill, it greatly increases output of the combined system.

- **The Whizzer principle gives sharper separation with higher recovery of fines, and also provides wide range classification to 99.9% minus 400-mesh materials.**
- **The extra large powerful fan develops maximum capacity rating of the separator.**
- **Increased size of frame members gives added strength and stability.**
- **Vertical slide dampers simplify fineness control, and they provide flexibility in changing from standard grades to high early strength cements.**
- **Improved lubrication system insures new economies in operation and maintenance.**

Whatever your plant capacity requirements, there is a suitable size Raymond Separator to meet your needs . . . also Laboratory Separators available for running tests.

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Raymond Division

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

New Canadian Atlas Issued—First in Forty-Three Years

Canada's first official atlas in 43 years is ready for distribution. The loose-leaf atlas contains 450 maps tracing the historic, economic, social, and political development of the nation. There are 110 map sheets.

The complete volume sells for $25 in Canada and $30 (in Canadian funds) outside the country. Individual map sheets will cost $.50 each. The atlas can be obtained from the Department of Mines and Technical Surveys, Ottawa, Canada.

1958 Mica Production Dips From 1957 Output by 11%

The 1958 output of sheet and scrap mica, as estimated by the U. S. Bureau of Mines, reached about 82,300 short tons, valued at about $3,664,000. This represented a decrease of about 11 percent in quantity and 20 percent in value, compared with 1957.

North Carolina continued to be the principal producing state. New Hampshire, Maine, South Dakota, and Georgia were other leading producers of sheet mica; Georgia, Alabama, and South Carolina were other major producers of scrap mica. Total imports, estimated at about 10,000 tons in 1958, and exports of 4,500 tons represented decreases of about 16 and 10 percent, respectively, from the 1957 total.

After several years of development work, the International Minerals & Chemical Corporation began production in 1958 of flake mica from river silt near Greenville, Tenn. This is reported to be the largest known source of flake mica in the United States, containing more than a half million tons of recoverable mica; it is the only operation in which mica has been commercially recovered from river silt.

Inorganic Fibers Tells Story Of World Asbestos Industry

Inorganic Fibers by C. Z. Carroll-Porczynski has been published in the United States by Academic Press, New York.

Asbestos, glass, minerals, and metals are among the materials covered in the work. Industrial uses and processes are discussed fully, with special attention to recent developments in the asbestos industry.

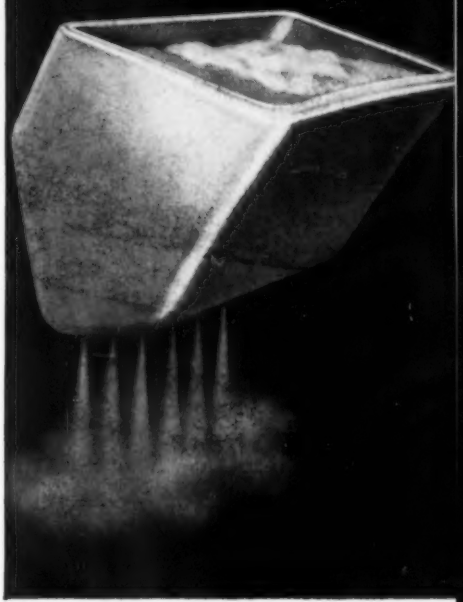
The 350-page book has numerous tables and references, and an author and subject index. It is available at $11 per copy from the Academic Press, 111 Fifth Ave., New York, N. Y.

Heavy machine shop staffers have worked 11 years or 2,000,000 manhours at Permanente Cement Company, without a single lost-time accident. Recently, each employee in the department was presented with a silver key chain and belt clip for his safety effort.

● This little red wagon found a new use when Dravo Corporation workmen needed a means of getting back and forth efficiently inside a 48-in. inside-diameter concrete pipe. The pipeline is part of a 10-mile stretch of tunnel Dravo is completing for the Allegheny County (Pittsburgh), Pa., Sanitary Authority sewage disposal system. Clean-up crews, removing waste matter after the pipe in this section of the tunnel had been laid, found the passageway too confining for hand-carrying of tools and materials. Toy wagons provided the needed transportation.

Another PLUS value...

HOLES MAKE IT HOLD MORE



Here's the answer to increased bucket capacity in your elevators: *Rex Style AC Buckets.* Unique air ports in the bottom act as a relief valve for faster loading and unloading...prevent entrapped air from restricting capacity. Closer spacing of buckets assures increased over-all elevator capacity. Style AC buckets are ideal for handling of light, fluffy materials. For all the facts, see your Rex Distributor or mail the coupon.

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JOB RECORDS PROVE

New Firestone Super Rock Grip Deep Tread slashes mining haul costs!

Firestone's new Super Rock Grip Deep Tread tire is setting long-wear records on the toughest hauls in the roughest terrain! The non-directional super tread is 50% deeper and has a thicker base compounded with Firestone Rubber-X, the longest wearing rubber ever used in Firestone tires. This all-new tread design spaces massive traction bars for top traction and better body protection. And with 50% more non-skid tread, operators report double the hours of original tread service! Extra-heavy sidewall construction is your best insurance against cuts and snags. The cord body is built with extra plies of Firestone S/F (Shock-Fortified) cord for reserve strength, longer life and more retreads. Ask your Firestone Dealer or Store about these tubeless or tubed heavy-duty Super Rock Grip Deep Tread tires today.

Super Rock Grip Deep Tread

Firestone

BETTER RUBBER FROM START TO FINISH

When ordering new equipment always specify Firestone tires.

Enjoy the Voice of Firestone on ABC television every Monday evening.

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● Punishing labor, the traditional connotation of work in the "salt mines," is a thing of the past—at least on this side of the Iron Curtain. In this photograph of one phase of salt-mining operations, mechanization has taken over in the Weeks, La., mine of Morton Salt Co. where operations are conducted at 585- and 760-ft. levels in a halite dome.

The Traxcavator is stockpiling salt shot down for subsequent removal by a Joy loader. After that operation, the Traxcavator is used to clean out remaining loose material and to police the area. It then tows and positions an undercutter for preparation of another bench shot. Fully mechanized, Morton's Weeks mine is producing 1,500 t.p.d. with a 40-man crew directed by Richard Glaubrecht, superintendent, and Wayne West, assistant manager.

First Fine Sand Plant in S. C. Opened by Whitehead Bros.

The Whitehead Brothers Company has opened a plant near Blaney, S. C., to produce finely graded sand for foundries and other industrial uses. This is the first plant of this type in South Carolina.

Constructed in two major sections, the facility consists of a 50-t.p.h. washing and sizing plant and a 30-t.p.h. drying installation.

Packaging Magic Tells Story Of Cement Bagging Methods

Packaging Magic, an attractively designed and illustrated brochure published by the St. Regis Paper Company of New York, tells the story of packing in the cement industry. The narrative begins with the birth of the portland cement age and the invention of continuously-operating rotary kilns.

The parallel history of cement packaging is related from the days of cumbersome wooden barrels to today's efficient multiwall bags. From the maximum of 40 bags per man-hour, when cement bags were filled with shovels, to the present rate of 400 bags per man-hour, achieved with the new St. Regis machine, the packaging industry has progressed at a comparable rate with the cement industry.

American Concrete Institute To Convene in Los Angeles

The American Concrete Institute will hold its annual convention in Los Angeles February 23-26, 1959. February 23, and a part of the 24th will be devoted to technical committee working sessions, and the first general convention session will be held in the afternoon of the second day.

Technical sessions will begin on the third day, followed by the annual research session.

Rolland Brown has been appointed plant manager of the Southwest Concrete Materials Corporation, which operates a plant at Poyen, Ark., for the production of sand, gravel and lightweight concrete aggregate.

Construction will begin soon on a multimillion-dollar cement manufacturing plant at Mitchell, Ind., for the Lehigh Portland Cement Company. Groundbreaking for the new structure has been scheduled for the second week in February.

Another PLUS value...

Rex Roller Chains are designed to give you longest possible wear life. For example, as shown above, all standard roller chains have oil holes in the bushings to assure easy penetration of life-adding lubricant to the important pin-bushing contact area...a vital factor, particularly on high-speed drives. You get many more cycles of wear life...a PLUS VALUE premium chain at no extra cost. For complete information, mail the coupon.

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The Air-Gravity Conveyor
with the Smooth, Durable,
Porous Tile Conveying Surface.

The superiority of the exclusive KENNEDY porous tile design over other conveying surfaces has been conclusively demonstrated by many years of full scale operation. The smooth surface has no dead spots and no roughness to impede flow. The tile cannot sag and maintains its properties even at elevated temperatures. Years of operation with Air-Float have required no replacement of conveyor parts due to wear or deterioration.

Air-Float thus offers definite advantages over other horizontal conveying methods:

- There are no moving parts—nothing to wear—nothing to maintain
- Only small volumes of low pressure air are needed—uses less power
- Operates quietly—has high capacity—requires little headroom
- The conveyed materials are completely enclosed—there is no dust
- Permits flexible design—directional changes are simple
- Can be made from corrosion resistant alloys
- Eliminates lubrication, complicated gears, belts and chains, spare parts and down time for maintenance

Send for literature describing KENNEDY Pneumatic Conveying Pumps, Air Activated Containers, Air Float Conveyors, complete Pneumatic Conveying installations, and KENNEDY Research and Testing Services.

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R. A. Utiger (left), E.C.S.A. retiring president, congratulates Ronald G. Hardy, newly-elected president at the Association's annual meeting in Cleveland. Melvin Cruzen, vice-president (second from left), and David M. Groves, re-elected secretary - treasurer, look on.

Hardy Named President At E.C.S.A. Meeting— Research Topics Discussed

ELECTION of officers, choice of a site for its mid-year meeting and reports of significant research progress highlighted the annual meeting of The Expanded Clay and Shale Association held in Cleveland on January 8, 9 and 10. This association is composed of lightweight aggregate producers from 10 states.

Ronald G. Hardy, Onondaga Brick Corp., Syracuse, N.Y., was named president succeeding R. A. Utiger, Cinder Concrete Products Co., Denver. Mr. Hardy was formerly vice-president. Melvin G. Cruzen, Light Weight Aggregate Corp., Livonia, Mich., succeeds Mr. Hardy as vice-president. David M. Groves, Shalite Corporation, Knoxville, Tenn., was re-elected secretary-treasurer.

Named as directors (in addition to the officers) were William W. Karl, Lehigh Materials Co., Tamaqua, Pa.; Leo A. Scillia, Plasticrete Corp., Hamden, Conn.; Ben Batson, Shalite Corp., Knoxville, Tenn.; W. D. Heney, North Central Lightweight Aggregate Co., Minneapolis, Minn.; A. S. Johnson, Carolina Tuff-Lite Corp., Salisbury, N.C.; B. K. Powers, Virginia Lightweight Aggregate Corp., Roanoke, Va.; and Frank Leftwich, Sayre & Fisher Co., Sayreville, N. J.

A presentation on the possible application of the Tornado impact crusher to expanded clay and shale reduction was given by Thomas E. Bridgewater, president, Werco Steel Company, Chicago.

L. E. Pfeiffenberger, technical director of the Association, presented a report on *Design Practices for Selecting Proportions for Structural Lightweight Concrete*. This was a preliminary discussion on designs for lightweight aggregate plastic mixes, as performed in the Association-sponsored testing program. Mr. Pfeiffenberger's presentation was followed by a discussion on field practices of producer-members.

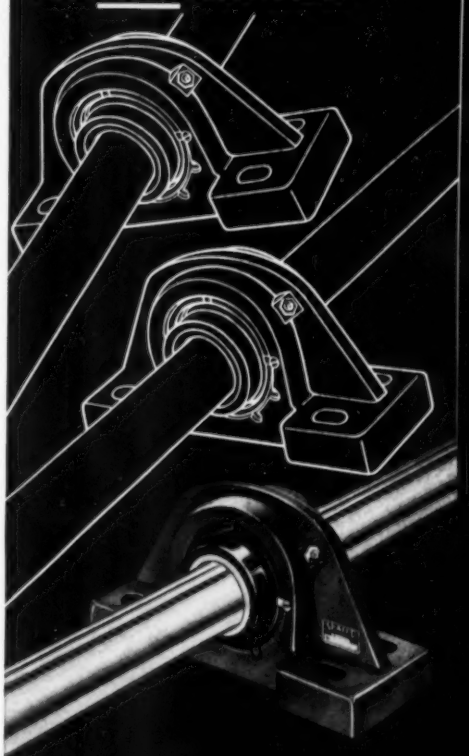
A tour of the sintering laboratory and pilot plant of the Dwight-Lloyd division of the McDowell Company at 16300 Waterloo Road, Cleveland, was the feature of Thursday afternoon's session.

Friday's sessions included a talk on *Introducing Lightweight Aggregate in a New Territory*, by W. D. Heney, executive vice-president and sales manager, North Central Light Weight Aggregate Corp., Minneapolis. This was a comprehensive report on how a producer goes about the job of acquainting a virtually new area with the advantages of lightweight aggregate. Techniques employed to tell the business community, as well as the general public, about a new operating plant, and to familiarize architects, contractors, and engineers with the aggregate were described.

New York City's Hotel Commodore will be the locale of the E.C.S.A. mid-year meeting, to be held from June 17 to 20 in conjunction with the Engineering Progress Exposition sponsored by the National Society of Professional Engineers and the New York State Society of Professional Engineers. E.C.S.A. will have a display booth in the grand ballroom of the Hotel Commodore.

Another PLUS value...

STAMINA
AT ANY ANGLE



Under loads or shocks from any angle, whether radial, thrust or combined loads, Shafer Self-Aligning Roller Bearings always retain their high load capacity. Add misalignment and the load still remains safely on the roller centers reducing retainer wear, increasing bearing life. Why? Shafer CONCAVE roller and true sphere race design—proved longer lived in thousands of installations. See your nearby distributor or mail coupon.

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NEW S-12

joins Euclid Rear-Dump Line!

The Model S-12 Euclid-Easton hauler—with payload capacity of 44,000 lbs.—is a new size Euclid over-hung engine type semi-trailer rear-dump. Designed and built as a complete, balanced unit, it combines the experience of two leading manufacturers of hauling equipment for mines, quarries and heavy industrial and construction work.

With 218 h.p. and 5-speed gear transmission the S-12 has a fast travel speed and ample power for the toughest jobs. Big 24.00 x 25 tires on all wheels provide traction and flotation for operation under conditions that would stop other haulers. For work in close quarters the 90° hydraulic steering and variable wheel base gives the unit exceptional maneuverability and helps cut cycle time.

Well reinforced body is constructed of special alloy steel to withstand the impacts of shovel-loaded rock and heavy excavation. Single stage double-acting hoists raise the body quickly, with smooth positive control all during the dumping cycle.

Have your Euclid dealer show you how this Model S-12, or the 12 and 35 ton semi-trailer models with 143 and 325 h.p., can cut hauling costs. He'll be glad to tell you about other Rear-Dump "Eucs" of 10 to 50 ton capacity, too.

EUCLID Division of General Motors Corp., Cleveland 17, Ohio

22-ton capacity
14 yds. struck
218 h.p.
24.00 x 25 tires
22.6 mph top speed

Euclid semi-trailer rear-dumps are available in 3 capacities—12, 22 and 35 tons with 143, 218 and 325 h.p. Tractors for these models are interchangeable on 7, 12 and 21 yd. scrapers.

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

Expendable pallets developed by Calaveras Cement Company are handled by 36-in. standard fork lift attachments or longer. The 5-lb. pallets are made of wood-reinforced corrugated paper board. Forks are inserted easily into specially constructed channels centered 26 in. apart.

Light Shipping Pallets Designed for Calaveras Reduce Weight, Cut Costs

Expendable pallets for shipping sack cement have been introduced by the Calaveras Cement Company after exhaustive tests in the field. Developed by the San Francisco company's own staff, the new pallets are expected to revolutionize shipping practices not only in the cement industry but in other industries as well. Patents have been applied for, and Calaveras plans to distribute the pallets through its recently organized subsidiary, Calco Supply Company.

Extremely light in construction, the 5-lb. pallets are made of wood-reinforced corrugated paper board. Each pallet can carry 31 to 36 sacks of cement weighing 94 lbs. each. Since three tiers can be stacked, the bottom pallet carries a maximum load of more than 5 tons.

Mel J. London, vice-president in charge of marketing, announced that Calaveras will provide the pallets without charge on all shipments of sack cement, freeing buyers from the necessity of furnishing their own heavy conventional pallets for every load. He indicated that the change-over will increase freight savings and payload by eliminating more than half a ton of wooden pallet dead weight on every standard flat-bed haul. Expenses for pallet repairs and sack breakage due to splinters or protruding nails, will also be eliminated. Standard fork lift equipment is used in handling the pallets, Mr. London said.

N.S.G.A. Invites Participation In 1958 Sand-Gravel Study

The National Sand and Gravel Association is engaged in compiling its sixth annual study of the economic contribution made by the commercial sand and gravel industry to the United States. According to N.S.G.A., the total sand-and-gravel output in 1957 was more than 627,000,000 tons, valued at approximately $600,000,000.

N.S.G.A. member-companies and also non-members are invited to participate in the study by furnishing information (confidential reports) on their 1958 production. Blanks are now being distributed by the Association, and prompt action in filling out the questionnaires is requested.

Fenton Facilities Acquired By Ernst Gravel Company

The gravel deposits, production and processing equipment, and other assets of the Fenton Construction Company, Troy, Ohio, were purchased recently by Anthony and Clarence Ernst, owners of the Ernst Gravel Company.

In addition to the gravel plant property, the Ernst brothers have also purchased the Fenton ready-mixed concrete plant, the block plant, and a delivery fleet equipped with two-way radio facilities. Ernst Gravel Company also operates plants at Houston and Piqua, Ohio.

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Another PLUS value..

TAKES MORE LOAD,
LONGER

Shafer Self-Aligning Roller Bearings, combining the low rolling friction of a ball with the greater load-carrying capacity of a roller, take severe loads easier, last longer. The inner race is a segment of a true sphere. Normal loads are carried on approximately half of the center contact area of the concave rollers, reducing friction. Under heavy loads, case-hardened races and rollers compress, increasing load-bearing surfaces. This provides exceptionally high reserve to handle shock loads and severe vibration.

This is also the right roller-race combination to handle thrust, → radial ↓ or angular ↙ loads, or all ↘ even under misalignment.

As a result, Shafer Bearings assure greater stamina, longer life for your equipment. See your nearby distributor, or write for latest catalog.

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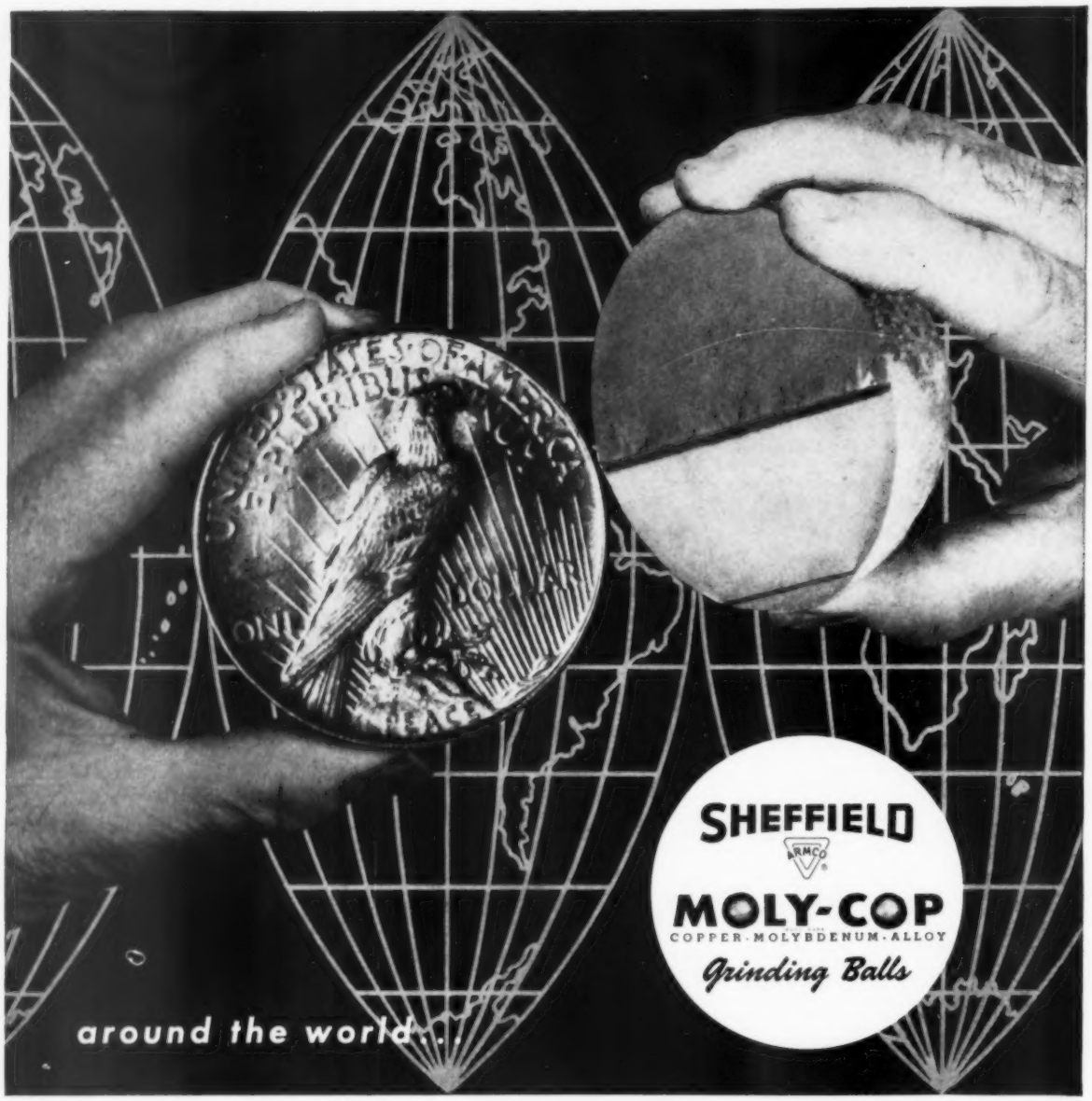

The Standard of Comparison for GRINDING ECONOMY

Sheffield alloying, forging and heat treating techniques assure the right combination of hardness and toughness—right to the core of the ball. Result: longer service life, less down-time, greater production economies. Something to remember next time you order grinding balls.

SHEFFIELD DIVISION

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

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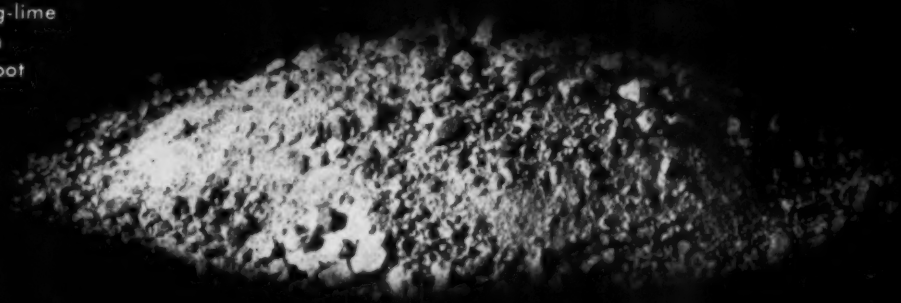
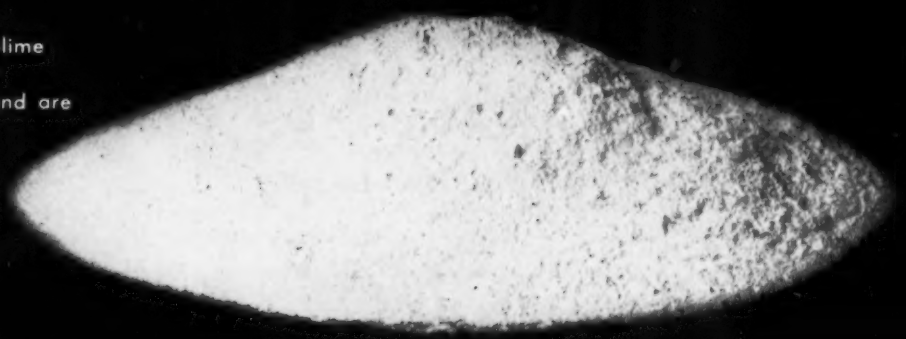
Enter 49 on card, page 123 →

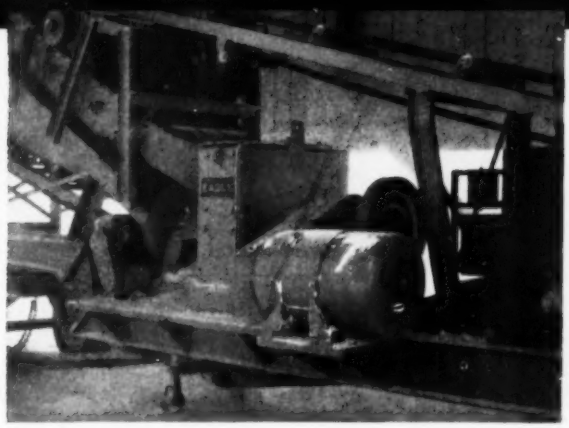


Coarse grades of ag-lime take longer to reach the plant's feeder root zone and are less desirable.

Ag-lime **FINES** bring more money



Fine grades of ag-lime bring almost twice the market price and are in great demand



(Eagle's portable cage mill at work on property of John W. Karch Stone Company, Celina, Ohio.) The purchase and installation of this plant resulted from a Karch sample being processed into an improved product through an Eagle Cage Mill. Completely satisfied with the results, this machine is now producing approximately 25 tons per hour—easily meeting all state specifications.

You can pick up the steady big premiums on finer ag-lime. Today's scientific farming demands this grade of ag-lime, which, because it is absorbed faster, can recover the investment faster with cash crops.

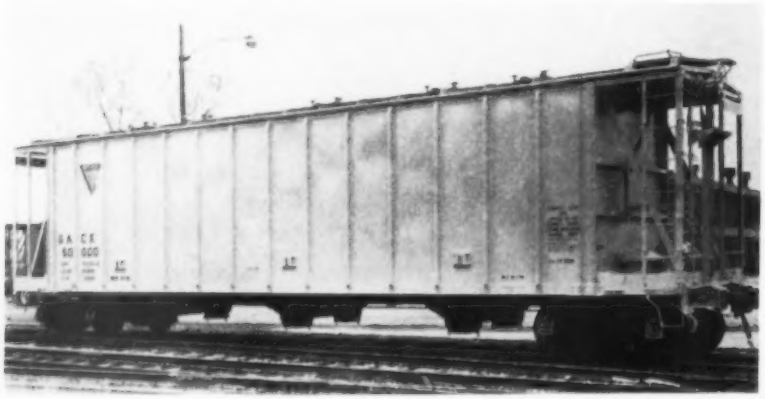
EAGLE CAGE MILLS produce more fines!

A single pass Eagle four-row cage mill with its high-speed impact, disintegrating action using hard-faced bars, not only produces a finer aggregate—it increases the tonnage as well! The single pass design has been producing this superior quality ag-lime at an average rate of 30 tons per hour, subject to variations in raw material and weather conditions.

EAGLE
JAW CRUSHERS · IMPACT BREAKERS
PULVERIZERS · CONVEYORS · LOADERS
CRUSHER CO., Inc. GALION OHIO U.S.A.

Special offer ... Send us a sample (200# to 500#) of your pit-run ag-stone, *freight collect*, for Eagle's gradation improvement test. We will put it through an Eagle Cage Mill, make a product report, and ship the resulting ag-lime back to you for your inspection. You're welcome to be on hand when the batch is processed, if you can make it. No obligations of any kind. We are convinced an Eagle mill can make more money for you and want to prove it to your satisfaction!

new machinery



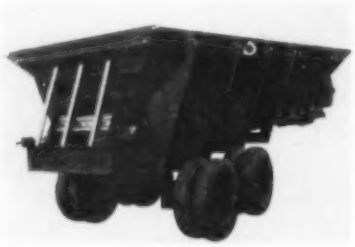
● A new and versatile covered hopper car, designed to handle dry products in bulk, has been developed by the General American Transportation Corporation. Principle new feature of the car is the internal loading gate, which is housed inside the car and assures perfect sanitation for a variety of dry products.

Named the Dry-Flo car, it has the following features: freedom from contamination, ease of cleaning, and greater rail clearance of the unloading gate outlets, enabling it to be used with any type of unloading system.

Since the unloading gate is located completely within the car, pickup of foreign materials is eliminated. The new unloading gates open vertically and are unaffected by the pressure or flow of the commodity being unloaded. The rate of flow of the car's lading during unloading operations is easily controlled.

Pneumatic nozzles, designed for vacuum unloading systems, are provided as optional equipment and are located so that unloading can be carried on from either side of the car. Discharge outlets have been placed at a minimum of 12 in. above the top of the rails to allow the contents to be handled by all existing unloading systems.

The Dry-Flo is built in two sizes —one of 3,500-cu. ft. capacity, the other, 2,450 cu. ft. Either can be equipped with 50- or 70-ton trucks. Both sizes are built in two styles—single compartment and multiple compartments. (351)



● New to the field is Pioneer Engineering's improved, extra-heavy-duty, portable long apron feeder for handling quarry rock and boulders to the primary crusher.

Length center to center between head and tail shafts is 30 ft. Width is 42 in. Pans are ½-in. thick forged steel, mounted on heavy-duty chain riding on steel rollers keyed to the supporting shafts. Overlapping corrugated pans reduce slippage and fines leakage.

The hopper, made of 1-in. thick steel plate, runs the full length of the feeder with sloping sides to prevent bridging and to provide large capacity. Full gussets support the hopper sides and extend from top of hopper to bottom of the main frame, but at the rear loading point these gusset braces extend to sills crosswise under the feeder so that the lower end can be cribbed or set on a foundation for additional support. Hopper extensions can be added to the lower end.

The feeder is transported on dual tandem rear wheels, pneumatic tire equipped, with equalizer. Fifth wheel hitch is provided for towing.

Weight of the feeder is approximately 45,000 lb. Overall width is 8 ft. 6 in. Power requirement is 25 hp. (352)

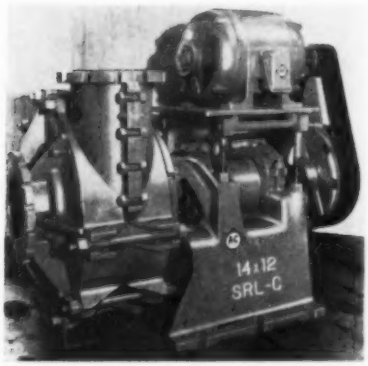
● Ward Weller Company, Inc., introduces a new crawler tractor shoe, the War-Wel Husky. Designed for longer life with minimum maintenance down time, the Husky presents such features as a cantilevered plate, sloped grouser, reinforced bulb section, rounded corners, and prehardened bolt holes.

Cast of high manganese or alloy cast steel, the Husky offers extreme strength without excess weight. The cantilevered plate braces the shoe against the pressure of rough terrain, preventing buckling or bending of the plate. The grouser is sloped at a 60-deg. angle, presents more surface to the ground, resulting in more push from deep down.

The reinforced bulb section runs the full width of the plate, around the ends, and up to the edges of the grouser, preventing curled-up corners and adding great transverse strength. Corners of the plate and grouser are rounded to prevent hanging-up on rocky terrain without sacrificing traction. (353)

and equipment

for further information use card on page 123



● Allis-Chalmers has extended the capacity range of its rubber-lined pumps with the addition of a new 14- by 12-in. unit. The new group is designed for heads up to 140 ft. at 870 r.p.m. and capacities to 8,000 g.p.m.

Allis-Chalmers rubber-lined pumps successfully handle abrasive, fine-mesh material ¼-in. round to 325 mesh. They are available in sizes from 2- by 2-in. to the new 14- by 12-in. unit in open or closed impeller models. (354)

● With the addition of nine new sets of gear ratios, the Fuller Manufacturing Company has expanded its line of three-speed auxiliary transmissions to include a total of 16 auxiliary units.

The expanded line includes splitting ratios, both underdrive and overdrive. With these splitting ratios, engines can operate at maximum horsepower through a full range of vehicle speeds. Deep reductions, in combination with splitting ratios, offer maximum flexibility both on and off the highway.

Fuller's heavy-duty 92 Series for engines up to 920 cu. in. piston displacement has been completed by the addition of five new sets of gear ratios. Four sets of gear ratios have been added to the medium-heavy-duty 65 Series. Ratios vary from .74:1 to direct drive in the high ratios and from 1.239:1 to 2.64:1 in the low ratios, with numerous variations in between. (355)

● A new heavy-duty TDM Trac-Drill designed by the Joy Manufacturing Company is designed to carry the Joy TM-450 drill, and is capable of drilling 3½-in. diameter blastholes to a depth of 40 ft. or more.

Completely automatic, the TDM Trac-Drill is capable of drilling from the toe hole position of 10 deg. above the ground level up through vertical and to 45 deg. forward of vertical. Horizontal holes approximately 8 ft. above ground level can be drilled. True vertical holes can be drilled on a 45-deg. grade. Upholes can be drilled at any angle up to 45 deg. above horizontal.

Two Joy six-cylinder, radial air motors provide a total of 23 hp. for tramming speed of 117 f.p.m. and make the TDM powerful enough to tow a 900-c.f.m. rotary compressor up a 10-deg. grade.

The TDM Trac-Drill is available with feeds for 10-ft. or 15-ft. steel changes. It can also be equipped with a special winch for steel handling and uncoupling. (356)

● The Trojan Division of The Yale & Towne Manufacturing Company announces the availability of the Trojan 124, a four-wheel-drive tractor shovel with three interchangeable buckets, a 1½-cu. yd. general utility bucket, a 1¼-cu. yd. heavy material bucket, and a 2-cu. yd. light material bucket. The Model 124 has a 10,000-lb. lifting capacity, with a dumping clearance of 10 ft. 3 in. under the hinge pin, and 8 ft. 4 in. under the bucket cutting edge.

Available with either gas or diesel power, the Trojan 124 is equipped with a planetary torque converter that has a 3.5:1 torque ratio. The high traction differentials in the axles allow for the transfer of power in a wheel not achieving full traction to the opposite wheel, permitting the full operational power of the machine to be used at all times. Travel speed ranges from 3 to 21 m.p.h. in third, both forward and reverse. (357)

With industry everywhere

the No. 1 choice is the V-belt with concave sides

It is easy to see why concave sides insure far longer belt life... and make Gates V-Belts the first choice of industry everywhere.

Just *make this simple test:* bend a Gates V-Belt as if it were going around a sheave. Feel how the concave sides (Fig. 1) *fill out* ... become perfectly straight (Fig. 1-A).

Note how this belt thus makes full contact with the sides of a sheave ... grips the sheave evenly, distributing wear uniformly across the sides of the belt. Uniform wear lengthens belt life — keeps costs down.

With a straight-sided belt (Fig. 2) the sides *bulge out* when the belt is bent, and wear is concentrated on the bulge (Fig. 2-A). Uneven wear shortens belt life — increases belt costs.

Because Gates V-Belts with concave sides are so universally preferred, they are also the *most widely available.* There are Gates Distributor stocks in industrial centers throughout the world.

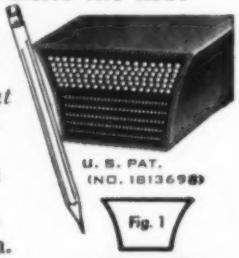


Fig. 1

Fig. 1-A

Fig. 2

Fig. 2-A

The Gates Rubber Company, Denver, Colorado

Gates — World's Largest Maker of V-Belts — TPA 2617

Gates VULCO ROPE Drives

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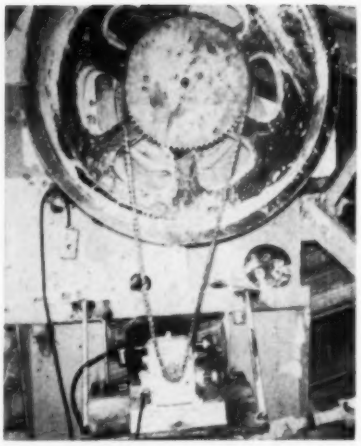


● A new positioning device to rotate crusher rolls during hardfacing and rebuilding procedures is being marketed by the Phoenix (Ariz.) Welding Supply Company and is available through Stoody Company distributors.

The unit allows the welding operator, at the touch of a remote switch, to turn the rolls slowly as rebuilding and hardfacing progresses. The operator is not required to descend from his welding perch to rotate the rolls manually. Ease of rotation encourages the operator to "skip-weld" as the work progresses to minimize heat input, assuring good welding results and reducing crack sensitivity. (358)

● A new line of combined gear reducer and gearshift drive units, giving four or eight speeds on the output shaft of the gear reducer, is announced by The Lima Electric Motor Company, Inc. This new line includes double and triple gear reduction units with motor capacities rated from 1 to 10 hp.

By moving the shift lever on the gearshift drive into one of four positions, four different output shaft r.p.m.'s are obtainable on the gear reducer. By using a two-speed motor in the gearshift drive, eight different speeds are obtained.

Standard electrical characteristics of the new gear reducer combination are: constant-torque, 3 or 2 phase, 60 cycle, 208, 220/440, or 550 v. Special voltages and frequencies along with mechanical modifications are available. It is possible to furnish constant-hp. output in all four speeds with selection of proper gear reducer. (359)

Which is the Best Screen for your job?

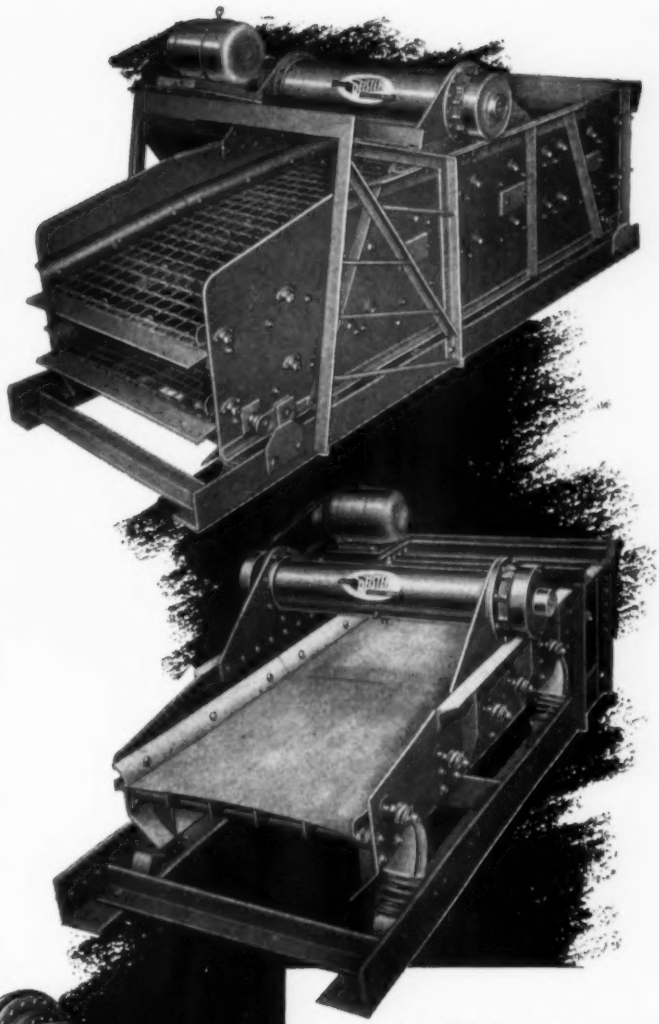
The vibrating screens you select to meet today's extremely competitive conditions must be highly specialized machines . . . designed especially to handle each of *your particular jobs*. And that's why Deister builds screens in four distinct *types* and in a complete range of *sizes*. For example:

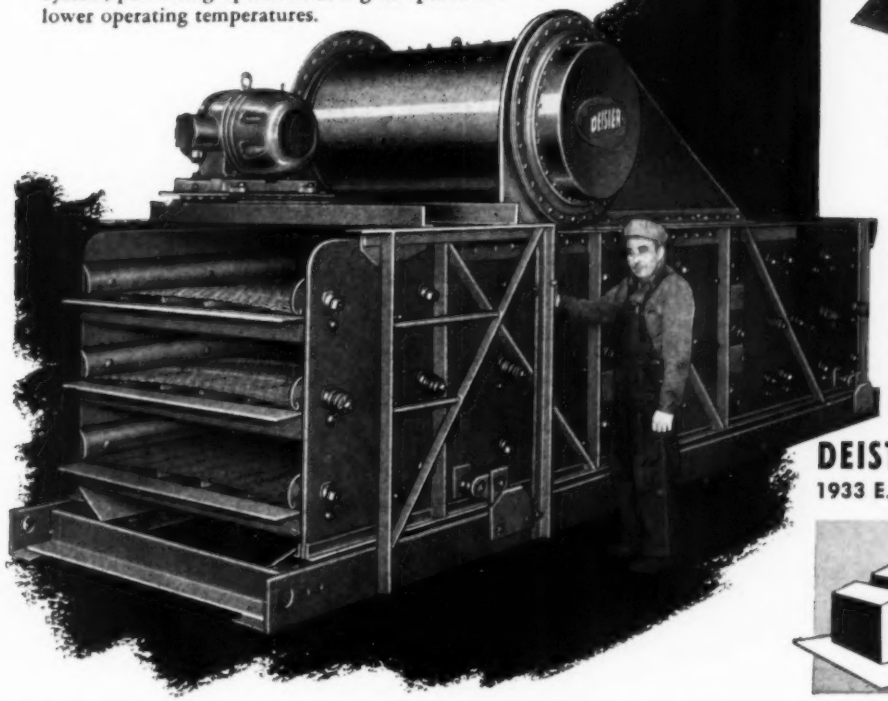
Type UHS. Deister Type UHS Screens are built in a full range of sizes to meet any heavy-duty screening job. Extra heavy-duty types are available for scalping and coarse sizing. The Deister principle of opposed elliptical throw provides maximum capacity and efficiency in sizing. With Deister's exclusive Adjustable Slope Screen Panels, the screening angle of every Type UHS may be adjusted exactly at both feed and discharge ends to meet the specific requirements of your job.

Ag-Lime. Deister Ag-Lime Screens (Type USL) are designed to screen damp, sticky material through medium and medium fine screen cloth openings. They apply intense vibration at a relatively high frequency. For unusual conditions they are available with an Electric Screen Heater and a Ball Tray Deck.

Flat Screens (Type UF). If your plant design requires flat or horizontal screens, or if you need increased tonnage but lack the head room necessary to install larger inclined screens, investigate Deister Type UF Screens. They are also unusually effective for dewatering sand, gravel and stone.

An outstanding feature of *all* Deister Vibrating Screens is Deister's Exclusive Oil Mist Lubricating System, permitting operation at higher speeds and lower operating temperatures.





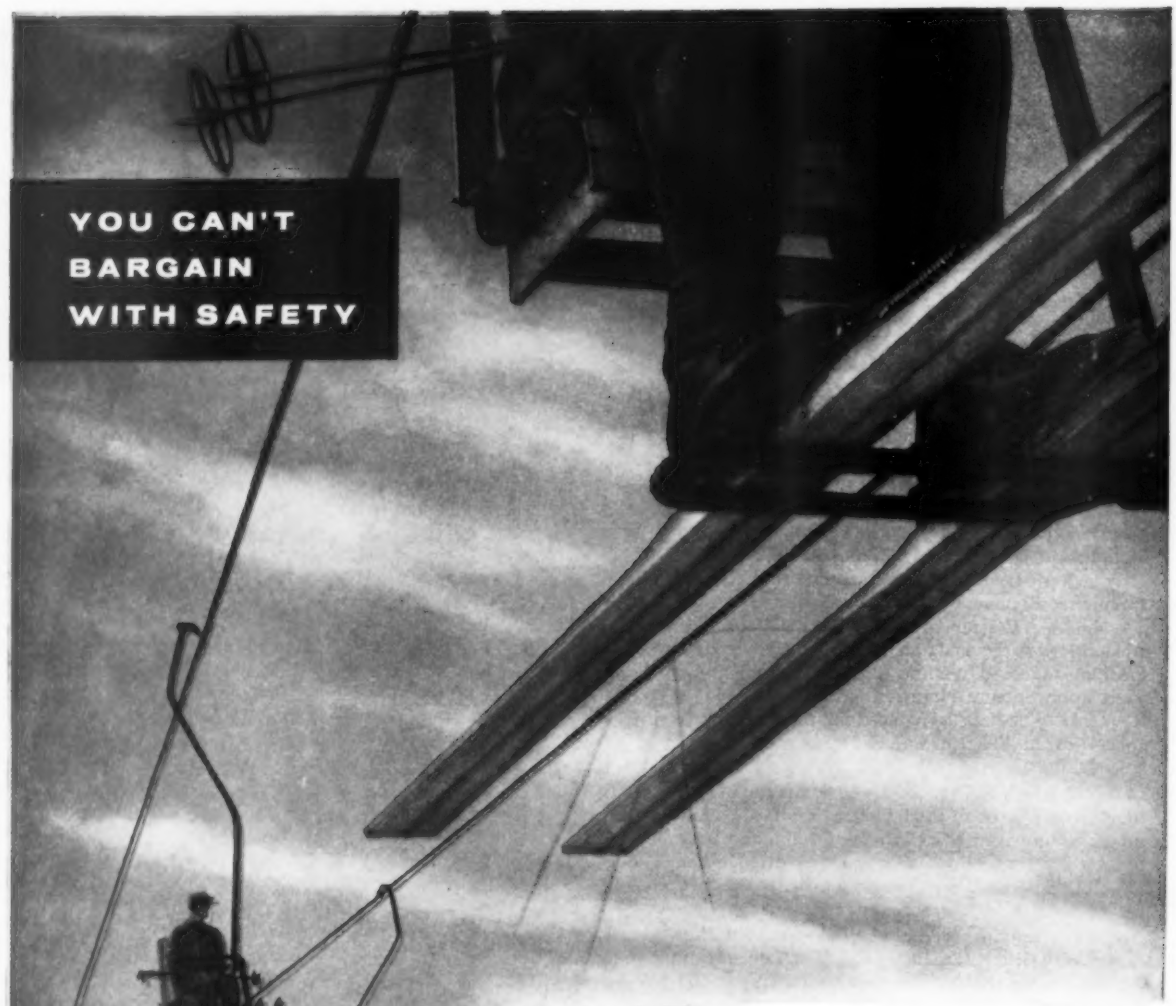
Top: Type UHS Screens are available in 3', 4' and 5' widths; in 10', 12', 14' and 16' lengths; and with single, double or triple decks.

Above: Type USL Ag-Lime Screens are built in 4' x 8' and 4' x 10' single-deck models.

Left: Type UF is built in 3', 4' and 5' widths; in 8', 10', 12', 14', 16' and 18' lengths; in single, double, triple and four-deck models.

DEISTER MACHINE CO.
1933 E. Wayne St., Ft. Wayne, Ind.

DEISTER



Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

CF&I

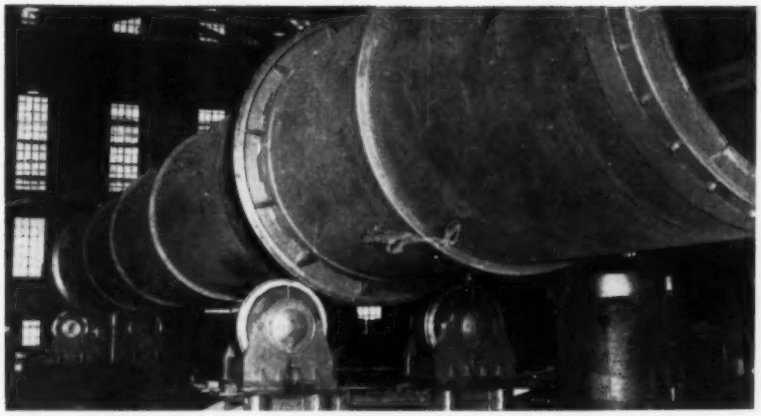
WICKWIRE ROPE
A CF&I PRODUCT

LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

5050

THE COLORADO FUEL AND IRON CORPORATION — Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia



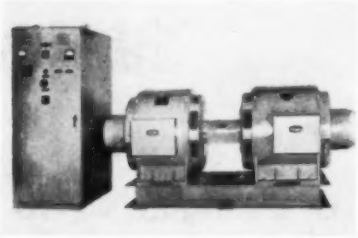
Spherical roller bearings are among the several design improvements featured in Vulcan's new rotary kiln.

The kiln employs SKF spherical roller bearings, which are reported to have a minimum life of 100,000 hours.

● Vulcan Iron Works has produced a rotary kiln taking advantage of new improvements to design a mechanical component that will serve the process industries.

The kiln employs swiveling trunnion rollers that automatically align themselves with the axis of the kiln and so take only radial loading. An assembly has been designed to absorb the thrust load incident to the slope of the kiln. This loading is constantly applied and thus not subject to allowance for impact. The thrust is carried by a bearing both above and below the thrust line of action, with ample face width of the roller.

The SKF spherical roller bearings incorporated with this predictable load design are reported to have a minimum life of 100,000 hours. Weighing about 40 tons, the kiln utilizes Farval gear lubrication, Falk flexible couplings, a Westinghouse motor, and gear reduction by Philadelphia Gear. It includes a 4-ft. by 25-ft. cooler and a combustion unit. Alloy steel rollers with a Brinnell hardness of 245, and alloy steel tires with a hardness of 210 are used. **(360)**

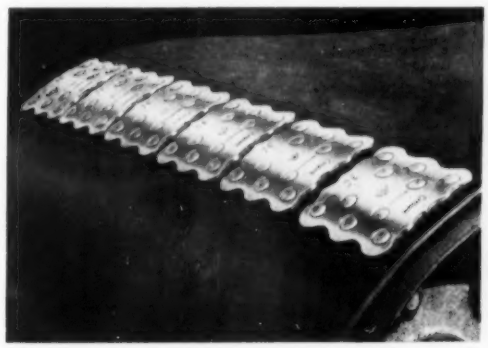


● Synchronous motor driven frequency changers with 400-cycle, 3-phase output are now available from the Kato Engineering Company as large as 250 kw.

The unit illustrated consists of a 150 k.v.-a. unit power factor, 120/208 v., 3 phase, 4 wire, 400 cycle alternator mechanically connected in tandem to a 250 hp., 440 v., 3 phase, 60 cycle, 1,200 r.p.m. synchronous speed drive motor. The construction of this unit is typical of the larger units. Both motor and alternator are dowelled to the structural steel base.

The control cubical contains all necessary metering, circuiting, and synchronous motor starter for the motor. A matching panel, not shown, contains necessary automatic voltage regulator and other necessary controls. **(361)**

Excessive abrasive conditions now solved!



Conveyor belting subjected to heavy abrasive work can now be readily joined for maximum service with the new CRESCENT Countersunk Belt Fasteners. The CRESCENT Countersunk-Head Rivets are driven flush with the surface of the CRESCENT Countersunk Plates, thereby reducing wear to a very minimum.

A hammer is the only tool required to make a quick, tight and long-lived joining. The CRESCENT Countersunk-Head Rivets are self-piercing and self-clinching, thus no holes to align and bore . . . a big time saver.

Don't gamble . . . our extensive experience over the years in joining and repairing conveyor, elevator and transmission belting of any length, thickness and width is at your disposal without obligation. Get the facts today!

CRESCENT BELT FASTENER COMPANY

381 FOURTH AVENUE, NEW YORK 16, NEW YORK

65 Market Street, Toronto 1, Ontario, Canada — 32 Paradise Street, Birmingham 1, England

DISTRIBUTORS THROUGHOUT THE WORLD

CRESCENT BELT FASTENERS fastest, most durable and most economical method of joining conveyor, elevator and transmission belting

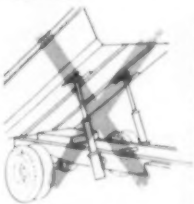
Enter 55 on card, page 123

(Also ask about new 10-yard Dumptor)

Output increased 9%

What's the dumping time of your hauling units — 15, 20, 25 seconds? Right there is where you can save time, get more trips an hour by dumping in *one second* with Koehring® 6-yard Dumptor®. It has no slow-acting mechanical hoist. Operator trips the body-release lever, and *gravity* tilts the body 70°. One second later the load is out, and Dumptor is on its way back for the next load.

This adds up to a substantial increase in extra yards hauled per hour. For instance, take a typical 1,000-foot haul where an ordinary dump truck would make 16 trips an hour. Allowing the same time to load, haul and return, Koehring Dumptor would average 17½ trips on the same cycle. That's because one-second dumping cuts 20 seconds off cycle time — gains a total of 320 seconds, or 5.3 minutes more productive time per hour — gives you 17½ trips, instead of 16. This, alone, adds 9% to hourly yardage output with Koehring Dumptor. But that's not all —



No body-hoist maintenance

There are no expensive body-hoist replacement parts, no hoist maintenance or down-time delays, because *gravity-dump* never balks, never wears out. You get the same one-second dumping *every time*. What's more — Dumptor has no springs — just one big snubber type shock absorber on steering axle. Big shock absorbing tires eliminate the need for springs on the drive axle. No springs — *no spring maintenance!*

Add up *your* dump-time, body-hoist and spring-maintenance costs — see for yourself how much you can save by hauling with Koehring heavy-duty Dumptors. Check too, how *no-turn* shuttle-hauling cuts another 15 to 30 seconds off cycle time. Call Koehring distributor about it *today* — or write for new catalog.

KOEHRING DIVISION of Koehring Company, Milwaukee 16, Wisconsin

KOEHRING® DUMPTOR®

K813

EXCAVATORS • CRANES • *twinbatch*® PAVERS • FINISHERS • MUD-JACK®

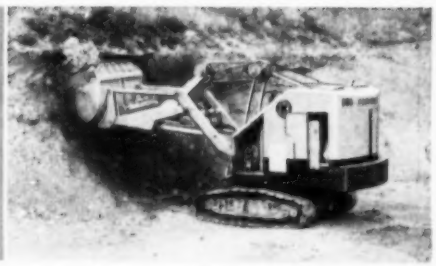
SKOOPER

REVOLUTIONIZES *digging...loading*

1. 2 yard loader...full revolving, free-swinging for faster cycles.
2. "Stand-still" loading eliminates high maintenance costs of front-end loaders.
3. Cuts fuel and servicing cost by moving up to 400 tons per hour with *only* 70 horsepower.
4. 7′ level clean-up plus more utility because SKOOPER cuts any angle of bank slope.
5. Versatile... convertible to use with any excavator attachment.

Dozens more startling and revolutionary SKOOPER advantages... call your Koehring distributor now to see SKOOPER at work... or write for all the facts.

SKOOPER'S wide bucket can cut evenly up a sloping bank as well as on a level grade. Crawlers can be headed into digging or parallel bank.



SKOOPER can load to 9'11" over side or end of truck, make 90° dig-swing-dump-and-return cycle without travel, cuts number of trucks needed.

Mail to: KOEHRING Division, 3026 W. Concordia, Milwaukee 16, Wisconsin

Send us: ☐ bulletin ☐ specification sheet on revolutionary new SKOOPER

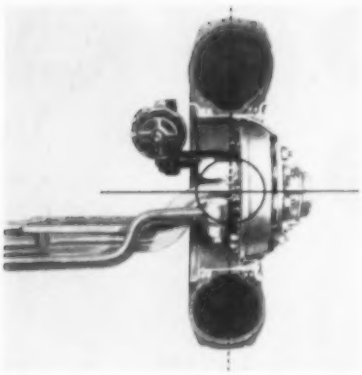
NAME..... TITLE.....

COMPANY..... DEPARTMENT.....

STREET..... CITY, STATE.....

K900 PQ

KOEHRING® DIVISION OF KOEHRING COMPANY • Milwaukee 16, Wis.



● Easier steering without power assistance is claimed for a new Timken-Detroit Center-Point steer front axle just introduced by the Transmission and Axle Division of the Rockwell-Standard Corporation. Other advantages, according to Rockwell engineers, include safer operation of the vehicle because of better control and less driver fatigue, and reduced maintenance with less downtime.

In the new center point design, the king pin is perpendicular to the ground line and is moved outward into the wheel so that the center line of the tire and the center line of the wheel are on a relatively common plane. This design permits the king pin to act merely as a pivot point while the vehicle load is supported solely by the axle. By thus relieving the king pin of the job of partially lifting the load as the wheels are turned, as in conventional front axles, less steering resistance without loss of any vehicle control is accomplished.

Knuckle pin bushings and other linkage parts, also moved outward into the wheel, last longer because of the reduced load they must carry. And because road shocks and lateral pressures are transmitted directly to the axle beam, tires and all steering parts have longer life. **(362)**

GOT WATER?

GET

FLYGT

...THE 24-HOUR PUMP

Reasons for the world-wide success of FLYGT B-80L pumps:

Electric, fully submersible, fully portable (185 lbs)
Instant pumping — no priming, no installation
Runs dry without damage
Takes high proportion of solids
Practically no maintenance or supervision
Frost- and fire-proof
6 hp, 3" hose, 330 GPM, max. head 170 ft.

Also: *FLYGT B-38L — 1.8 hp, 75 GPM, 70 lbs, max. head 90 ft., 1½" hose; FLYGT B-80 Marine—6 hp, 330 GPM, max. head 145 ft., 3" hose; FLYGT B-150/200L — 65 hp, 3,000 GPM, max. head 220 ft., 6" or 8" hose, 1200 lbs. Higher heads with FLYGT pumps in tandem.*

FLYGT

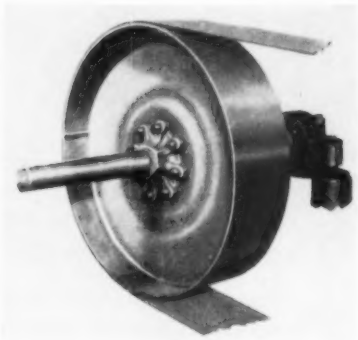
WEST OF THE MISSISSIPPI:

Stanco
MFGS. & SALES INC.
1666 Ninth St.
(Corner of Olympic & Ninth)
Santa Monica, California.

EAST OF THE MISSISSIPPI:

STENBERG MANUFACTURING CORPORATION
Hoosick Falls, N.Y.

Enter 58 on card, page 123



● New welded-steel bucket elevator pulleys developed by The American Pulley Company have accurately roll crowned pulley rims for easy belt tracking. Two types of pulley are available: pulleys with face widths up to and including 13 in., made with one center disc; and pulleys with wider faces, made with two discs and two hubs. Both single and double disc widths are light, strong, true-running, and easily cleaned.

Center discs are corrugated so that belt pull stresses at the hub section are dissipated. Hubs, saw-slit through one side, have accurately machined tapered shoulders which match the inside tapered bore of the discs. Six or eight high-tensile bolts pull each hub into its mating disc and clamp the pulley to its shaft with a permanent Wedg-Tite grip. **(363)**

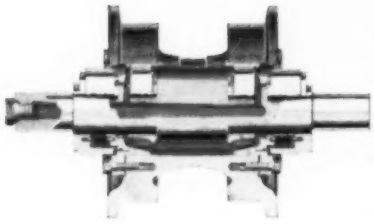
Why waste time greasing track on any of your tractors...

when you can have

Permanent Lubrication CERTIFIED

The Positive Seal PERMA-SAFE Wheel

for truck wheels, front idlers and support rollers on all models of Allis-Chalmers crawler tractors



Now... Allis-Chalmers announces PERMA-SAFE lubrication for all models in its crawler tractor line . . . climaxing more than 20 years of constant research and on-the-job experience with Positive Seal, tapered roller bearing design. Now you can forget about track-level greasing...convert that lost time to profit time. Allis-Chalmers, pioneer of extended lube intervals, lets you take this big step ahead with complete confidence.

See your nearby Allis-Chalmers dealer for the full story now. Allis-Chalmers Construction Machinery Division, Milwaukee 1, Wisconsin.

move ahead with ALLIS-CHALMERS

. . . power for a growing world

ENGINEERED
CRAFTSMANSHIP KEEPS
CLEVELAND WIRE SCREENS
'way out in front

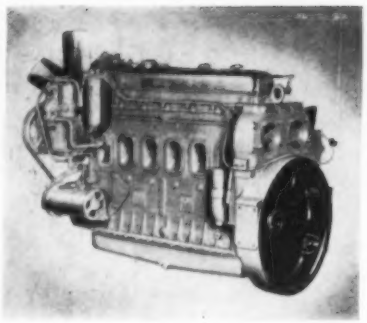
Yes, making quality wire screens for heavy duty vibrating equipment is more than just a weaving process. To maintain high tonnage output and longer screen life, proper wire thickness and rigid accuracy of openings, the uniformity of weave must be controlled constantly.

Cleveland Wire screen sections are designed for all types of mechanical and electrical vibrating equipment.

Complete bulletin files, describing weaves, are available upon request. For faster sales service call Diamond 1-1832.

The CLEVELAND
WIRE CLOTH & MFG. Co.
3576 E. 79th St. Cleveland 5, O.

Enter 60 on card, page 123



The series 71 engine, available in two-, three-, four-, and six-cylinder single engines and in multiple units, is the basic engine used in the new V-71 single and multiple models.

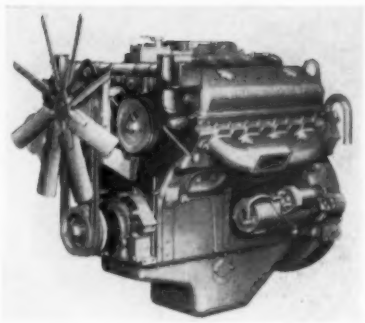


Photo shows space saving configuration of the new V-type diesels. They are available in six-, eight-, twelve-, and sixteen-cylinder units, ranging from 195 to 675 maximum horsepower.

The 12V-71 and 16V-71 engines fill the high power requirements of large off-the-road vehicles.

GM's new 2-53 engine is offered in the recently introduced John Deere 440 industrial tractor.

● The Detroit Diesel Engine Division of the General Motors Corporation has added eight new basic units to its line of two-cycle diesel engines. Formerly covering the 30 to 893-hp. range, the GM diesel line has been broadened into an all-purpose power line offering single, multiple, and turbopowered engines ranging from 20 to 1,650 hp.

New to the line are four single V-type engines in the "71" series, ranging from 22 to 675 hp., and a group of smaller engines, known as the "53" series, ranging from 20 to 195 hp.

New V additions to the "71" series include a six-cylinder unit of 252 maximum horsepower (the 6V-71); the 8V-71 with 334 maximum horsepower; a 12V-71 of 504 maximum horsepower; and a 675-hp. 16V-71 engine. In addition to 6-71 and 110 multiple units, 12V-71 and 16V-71 twins are now available delivering up to 1,008 and 1,350 maximum horsepower, respectively. When turbopowered, the 16V-71 twin will deliver up to 1,650 maximum horsepower.

The new "53" series includes "in-line" engines of two-, three-, and four-cylinder units ranging from 20 to a maximum of 130 hp. Also in this new line is a six-cylinder V-type diesel engine of 195 maximum horsepower.

The compact V engines with their two-cycle design and low weight-per-horsepower can, in most instances, be installed in space ordinarily occupied by engines of considerably less horsepower.

With only three cylinder sizes in the entire line, pistons, rings, valves, valve operating mechanisms, injectors, and many other parts are interchangeable, engine for engine, within each series. (364)

Enter 61 on card, page 123 →

How 2 cu. yd. Trojan handles all loading operations for Midland, Texas Plant.

Replacing another tractor shovel, this Trojan 154 gives a production boost to the ready-mix plant of West Texas Concrete Products, Inc. The precision control, fast travel speed and high capacity allow it to keep the batcher loaded and still handle truck loading, stockpile maintenance and other chores around the plant.

Trojan 154 digs in, moves material and charges batcher on a fast, continuous cycle.

Your TROJAN distributor can help you with the many advantages of YALE Financing plans, the most complete ever offered to equipment buyers . . . TIME PAYMENTS, LEASING PLANS (with or without OPTION TO PURCHASE) . . . exactly what you need to finance your new TROJAN machines.

TROJAN®
TRACTOR SHOVELS
YALE & TOWNE

TROJAN 154 BETTERS RATED CAPACITY—PROVES "INDISPENSABLE" IN READY-MIX PLANT OPERATION

High capacity and precision control were the features that sold West Texas Concrete Products, Inc. on the Trojan 154. They needed a fast operating machine with the ability to dump exact amounts of material into the batcher. This was no problem for the Trojan 154. . . . But they required a machine with a 2½ cu. yd. capacity. A trial of the 2 cu. yd. model 154 proved that the Trojan could better its rated capacity by ½ yd. load after load, day after day, and still maintain work cycles fast enough to allow it to handle other jobs around the plant area. "The Trojan 154 is a fast loading, fast travelling machine." says Mr. John Marlow, Plant Superintendent of the Midland, Texas Plant. "Its part in boosting the speed of our operation has meant considerable savings for us."

A loading operation for the Trojan tractor shovel involves carrying 6,000 lbs. of rock, 8,000 lbs. of regular sand and one load of fine sand — dumping the correct amounts into the batcher and returning the surplus to the stockpile. The batcher, in turn, dumps the mixture into the ready-mix truck. The fast loading cycles of the Trojan 154 help to complete this entire operation in six minutes.

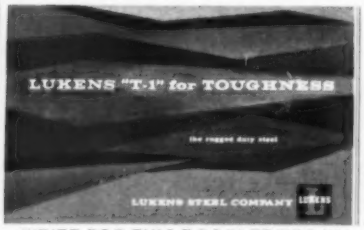
TROJAN DIVISION, THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK, SAN LEANDRO, CALIFORNIA

Where the going gets rough...

get tough

with Lukens "T-1" Steel!

TRADE-MARK



WRITE FOR THIS BOOKLET TODAY

■ Wherever rock and gravel, coal and ores come in violent contact with machine and equipment parts, Lukens "T-1" steel—*especially extra tough 321 min. BHN quality*—fights back at wear and abrasion with spectacular success.

It is readily fabricated. You can form or weld it in the field or shop, from stock plate sizes immediately available. It can be used to replace or repair worn bucket teeth, truck and mine car bodies or liners, dozer blades, dipper sticks, crusher teeth, chutes, and many other parts.

Far stronger for its gage than conventional steel, it requires less metal to do equivalent jobs. It remains tough even at sub-zero temperatures.

Contact your nearest warehouse listed below, or write Manager, Marketing Service, 146 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania. Ask for special bulletin, "*Lukens 'T-1' for Toughness.*"

WAREHOUSES

Ashland, Kentucky, Mansbach Steel Co., 19th St. & River Front
Baltimore 2, Maryland, Wm. G. Wetherall, Inc., 317 President Street
Birmingham 2, Alabama, O'Neal Steel, Inc., P. O. Box 2623
Cleveland 6, Ohio, Mills-Wolf Steel Co., 10006 Carnegie Avenue
Los Angeles 33, California, The R. J. M. Company, 238 Mission Rd.
Montreal, Quebec, Can., Drummond, McCall & Co., Ltd., 930 Wellington St.

HELPING INDUSTRY CHOOSE STEELS THAT FIT THE JOB

P&H Diesel Model 687C-18 with Cotta 1.46 to 1 transmission and dual air cleaners at the rear. 50 KW generator, 240 volt—1800 rpm with dust-tight package controls, driven from front end.

NEW

P&H DIESEL-ELECTRIC POWER PACKAGE

a compact unit... only 4850 lbs. complete!

With many portable crusher operators switching to electric motors for powering conveyors and auxiliary equipment, P&H has designed the ultimate in a compact, lightweight "power package".

It's the 205 H.P., 6 cylinder P&H Diesel and 50 KW generator. Engine, Cotta Gear, generator and base weigh just 4850 lbs. complete—*up to one half ton lighter than comparable equipment.* The generator, driven directly off the engine crankshaft through a flexible coupling, is a feature of P&H modern design that eliminates belt wear, slippage and maintenance. The P&H Diesel itself has these added advantages:

- **More power**
- **Higher torque**
- **Faster starts**
- **Better idling**
- **Big weight savings**
- **Greater fuel economy**
- **25% fewer parts**
- **All wearing parts interchangeable**

P&H Diesel units are also available as direct power and for diesel-electric generators. It will pay you to specify P&H Diesel for your new crusher or your next repowering job. Contact your P&H dealer. Or write, Dept. 420B.

P & H combination power unit and generator set powering a Baldwin-Lima-Hamilton 201E Crusher through a Cotta Reduction Gear and driving a 50 KW generator. Owned by Yoder Asphalt, Inc., Elkhart, Ind. Sold by Korte Bros., Ft. Wayne, Ind.

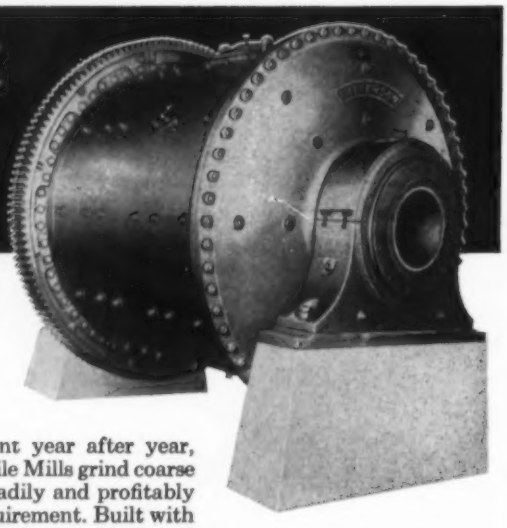
HARNISCHFEGER

P&H **Diesel Engine Division**
Crystal Lake, Illinois

Patterson –

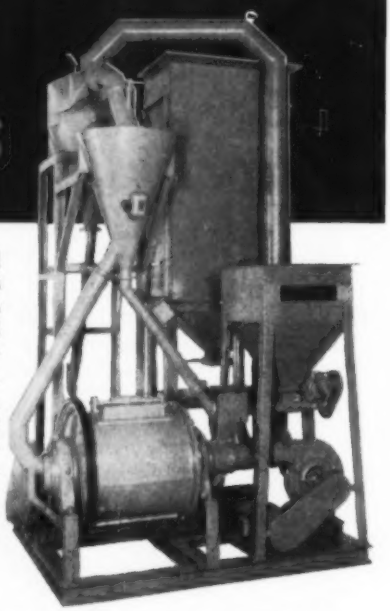
your one-word key to profitable grinding

in BALL, TUBE and ROD MILLS



Built to take punishment year after year, these heavy-duty, versatile Mills grind coarse or fine—wet or dry—steadily and profitably for every production requirement. Built with cast manganese or chrome-moly head and grate liners, these Mills are furnished with replaceable cast manganese, ni-hard or rolled steel shell sections, and can also be supplied with buhrstone, porcelain or high-density alumina linings. Let our engineers select the right mill for your grinding needs.

or COMPLETE GRINDING SYSTEMS



Patterson Systems are designed and built to fit your production demands —whether 50 lbs per hour or 50 tons per hour. Shown is our widely-used pilot plant system, with 2′ x 2′ continuous mill, pneumatic classifier, cyclone product collector, dust filter, feeder, feed bin, air supply blower and all necessary piping. The unit is mounted complete on a single base, requiring only an electrical connection. Let our laboratory grind samples of your materials—let our engineers consult with you. Write!

THE *Patterson* FOUNDRY AND MACHINE COMPANY

A Division of Ferro Corporation

East Liverpool, Ohio

THE *Patterson* FOUNDRY AND MACHINE CO. (CANADA) LTD.

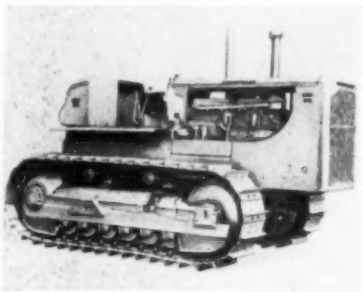
Toronto, Ontario

Enter 64 on card, page 123

● Economical belt repairs can be accomplished in 15 minutes using the Pang process of cold vulcanization, according to the Automatic Vulcanizers Corporation. With Pang compounds, vulcanization is suspended. By simple mixture with a chemical activator, Pang compounds will cure at temperatures ranging from 65 deg. F. to 125 deg. F.

Available in liquid or paste form, Pang compounds are equally effective in correcting breaks which occur on the edges of the belt, impact breaks, and in fabric replacement and splicing. **(365)**

● Two new Caterpillar D8 tractors, both possessing increased weight, horsepower, and productive ability over their predecessors, have been introduced by the Caterpillar Tractor Company. The new machines



are the Caterpillar Series H D8 direct drive and torque converter tractors.

Engine horsepower rating of the D8 series H tractor at the flywheel is 225. Drawbar horsepower of the direct drive model is 180. These new model tractors are powered by four-cycle, valve-in-head, tubocharged six-cylinder diesels, having a bore and stroke of 5¾ by 8 in., with a piston displacement of 1,246 cu. in. The engine is governed to 1,200 r.p.m. at full load.

The new transmission on the direct drive model is directly reversing in all 6 speeds. Top reverse speed is nearly double that available on the previous direct drive model. In addition, the new high forward speed has been increased to 6.3 m.p.h. from 5.2 m.p.h. The new transmission has four shafts, rather than three as on the previous direct drive transmission, and retains the easy-shifting characteristics of constant mesh gears. **(366)**

Beat tough "Specs" with the

MECKUM SAND & GRAVEL JIG

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The Meckum Jigs' high acceptability and performance is proven as the jigged aggregates meet increasingly rigid 'specs' with ease, enabling you to obtain new contracts and greater profits. With amazing simplicity and low cost of operation, Meckum Jigs produce premium quality concrete aggregates for only a few pennies per ton.

More Meckum Sand & Gravel Jigs have been installed, than any other method of removing deleterious materials from aggregate. Don't delay, be prepared. Find out how a Meckum Jig can benefit you.

MECKUM ENGINEERING, INC.

DAYTON ROAD, OTTAWA, ILLINOIS • 53 W. JACKSON BLVD., CHICAGO 4, ILLINOIS

● The Wedlok splice, a development of Raybestos-Manhattan, Inc., provides a safe, high-tension mechanical fastener splice on conveyor and elevator belts.

Wedlok consists of a V-shaped splice fastened with standard No.

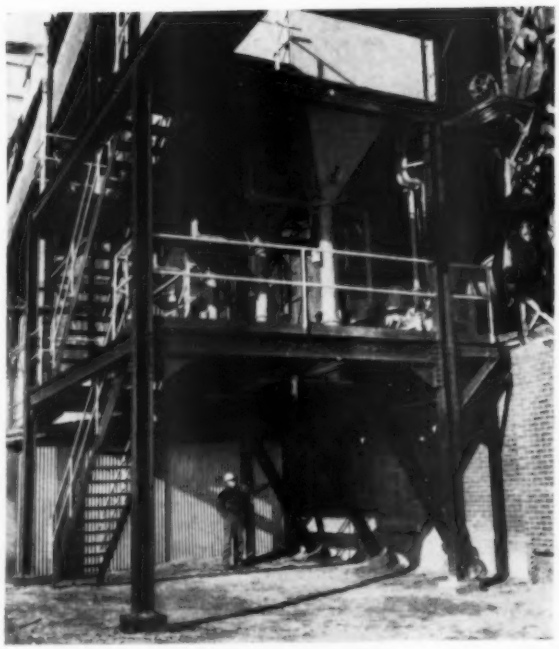
2 Flexco bolt and plate fasteners, and special Wedlok tip and tail fasteners. These special fasteners and the necessary templates for belt hole location, together with complete instructions, are available in the Wedlok kit.

The only tools required to make a wedlok splice are the inexpensive hand or power tools ordinarily used to make Flexco splices. A Flexco No. 2L punch and an S25 Extra-Life wrench are used for hand application or an HP2L punch and HW2 wrench for air or electric impact tools.

The No. 2 Flexco fasteners are installed in the belt across the splice cut, at a predetermined angle. The angle permits the Flexco fasteners to rotate slightly under tension. This action causes the cut edges of the belt to close tightly and make a permanent seal. The Wedlok fasteners stabilize this movement and securely anchor the tip and tail ends, assuring a trouble-free, long-lasting splice. To further stress relieve the ends, the last two Flexco fasteners on both sides of the tip and tail ends are installed at a different angle than the other Flexco fasteners.

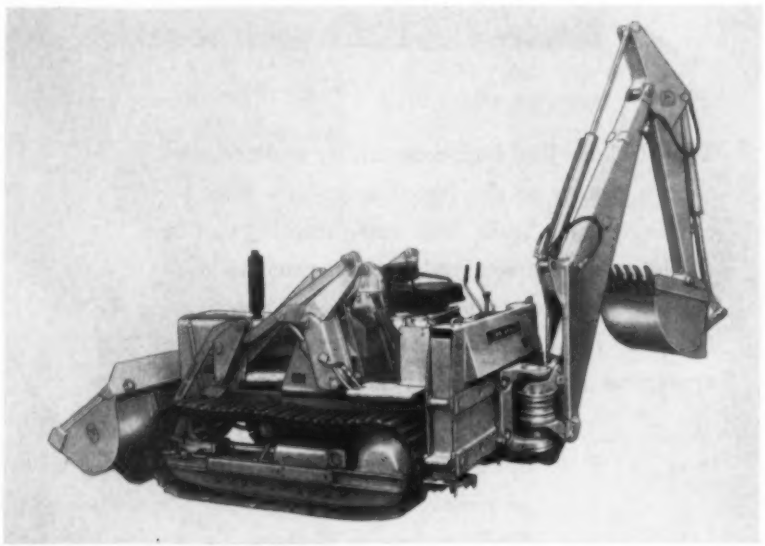
The Wedlok splice is recommended to function as a safe, dependable splice for operating tensions up to 700 lb. per in. of width rating on belts of five or more plies and thicknesses of ½ in. and over. **(367)**

● A modern tubular air filter system recently installed at the Syracuse, N. Y., plant of Allied Chemical's Solvay Process Division to control dust from limestone calcining has been modified with one of the company's own products—new large diameter polyethylene pipe.



As originally installed, the 25,000 - c.f.m. unit shown here had been equipped with steel pipe to carry the dust from the collecting bins to a recovery conveyor. The interior surface of the metal pipe did not lend itself to completely free flow of the fine particles.

Company engineers therefore substituted 8-in. plastic pipe made from the firm's ultra-high molecular weight polyethylene. The mirror-smooth interior of this pipe has offered no hinderance to the passage of the lime dust—an improvement that has resulted in considerable savings of time and money as well as increased reliability of operation. **(368)**



● Production is now under way on two new John Deere diesel-powered tractors, the 440 crawler and the 440 wheel models. The new tractors are powered by the General Motors "Jimmy" two-cycle diesel engine, which has a rated horsepower of 33¼ at 1,850 r.p.m.

Results of tests under all types of working conditions show that the new diesel-powered tractors will deliver approximately 10 percent more power than previous 440 models.

The 440 tractors will continue to be offered with a choice of gasoline or diesel fuel. **(369)**

Enter 67 on card, page 123 →

This great performance story began more than two years ago— and it's getting better all the time!

More than 50 Allis-Chalmers HD-21's are handling Toquepala's toughest jobs for Utah Construction Co. and Morrison-Knudsen Co., Inc.

Working up to 14,000 feet high in the Peruvian Andes, to develop a large mining project for the Southern Peru Copper Corporation, these tractors have been constructing roads . . . building railroads . . . preparing sites for entire new towns.

They've faced some of the toughest conditions in the world . . . rock, sand, dust, cold and high altitude all rolled into one. After two years of round-the-clock operation, these machines have piled up an outstanding performance and on-the-job record.

The Toquepala story is another good reason why you should have all the facts on the new HD-21. Across America, as in the Andes, leading construction men are discovering that the HD-21 is the long-life, big-production crawler tractor they've been looking for. See your Allis-Chalmers construction machinery dealer. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

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...power for a growing world

CRAWLER TRACTORS • MOTOR GRADERS • MOTOR SCRAPERS • TRACTOR SHOVELS
PULL-TYPE SCRAPERS • MOTOR WAGONS • UTILITY TRACTORS • POWER UNITS

Working on New Frontiers high in the Peruvian Andes

Mining specialists . . . men of construction . . . and a great fleet of giant Allis-Chalmers crawler tractors are changing a remote, mountain-top desert into a modern mining center.

Toquepala (*pronounced Toe-kay-páh-la*) is its name—a wilderness hidden deep in the ancient land of the Inca Indians, so bleak and devoid of rain it's truly a mountain-top desert. There, 11,500 feet above sea level, one of the biggest mining projects in history is now under way.

Among the first machines moved ashore at the start of this venture were big Allis-Chalmers tractor-bulldozers, and today they're part of the team that is breaking through the barriers to Toquepala. To span the 100 miles from the mine to the nearest seaport, these giant tractors are pushing aside sand and rock to help build a network of roads and a railroad . . . and they're biting into mountainous terrain to level a site for a new town of 10,000 people.

Thus, the might of modern construction machinery is helping to unlock the treasures of Toquepala, considered inaccessible just a few years ago. And when the ore is ready for processing, 14 huge Allis-Chalmers mills will start grinding up this 400-million-ton mountain of copper ore at the rate of 30,000 tons a day . . . free the valuable mineral from the waste and prepare it for concentration, smelting and refining. Then, Toquepala will be one of the world's great copper mining centers, and long-range needs for this vital metal will be supplemented by a new source of supply.

From trail blazing to processing, this mammoth project typifies Allis-Chalmers service to the mining industry—through an unusually wide range of construction, power and processing equipment. It also typifies Engineering in Action . . . bringing better living to more people wherever it goes. ALLIS-CHALMERS, GENERAL OFFICES, MILWAUKEE 1, WIS.

Toquepala is a project of the Southern Peru Copper Corporation, which is stripping more than 120 million tons of overburden to reach the actual ore deposit at the mine. Major construction work for the roads, railroad and town site is being handled by two famous American contractors, Utah Construction Company and Morrison-Knudsen Company, Inc.

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...power for a growing world

At sea level . . . or 14,000 feet up

Allis-Chalmers HD-21's are the tractors for your tough jobs

Big Allis-Chalmers tractor-dozers cut the rocky, mountain country to size to develop a town site.

Men and machinery conquer the mountain-top desert . . . push aside rock and sand to build access roads.

HD-21 — 225 net engine hp; torque converter drive; 56,260 lb (approx. as shown)

You, too, can have the outstanding performance Utah Construction Company and Morrison-Knudsen Company, Inc. are getting from the more than 50 Allis-Chalmers HD-21's at Toquepala. Call your Allis-Chalmers dealer now. He will demonstrate the HD-21 on your job at your convenience.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

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Form MS 1316

Litho U.S.A.

Death of Roy E. O'Brien, Assistant Secy. of A.I.M.E., Great Loss to Industry

The death in Salt Lake City on January 9 of Roy E. O'Brien, field secretary of the American Institute of Mining, Metallurgical, and Petroleum Engineers, removed from the engineering profession and the minerals industry a nationally distinguished figure.

He was noted for his ardent pursuit of important duties despite ill health and for his ability, through wide experience, thorough-going knowledge of the industry and personal attributes to achieve outstanding success.

After having completed his education at the University of Colorado in 1923, he was associated with various mining concerns. In 1950 he was compelled by a heart ailment to leave his post as general foreman at Anaconda's phosphate operation in Conda, Idaho.

At that time he became western secretary of the Mining Branch of A.I.M.E. and simultaneously assistant secretary. In 1953 his title was changed from western secretary of the Mining Branch to field secretary of A.I.M.E.

A.S.T.M. Forms New Division For Study of Materials

A new Division on Materials Sciences will be organized by the American Society for Testing Materials to co-ordinate and intensify the development of knowledge of the fundamentals of materials. The new division, the first to be established by A.S.T.M., will augment in depth and scope the Society's long-time objectives of promoting knowledge of engineering materials and tapping new sources of knowledge for the Society's extensive standardization activities. The division will concern itself with the collection, establishment, and publication of basic information essential in creating a better understanding of materials and their properties.

Actual development of the division has been entrusted to a group of four officers—President K. B. Woods, head, School of Civil Engineering, Purdue University; two A.S.T.M. vice-presidents: F. L. LaQue, vice-president and manager, Development and Research Division, The International Nickel Co., Inc., and A. Allan Bates, vice-president of Research and Development, Portland Cement Association; and Robert J. Painter, executive secretary of A.S.T.M.

A quest for new sources of high-purity silica, particularly in the Pacific Northwest, is being included in the 1959 plans of the U. S. Bureau of Mines.

Labor Developments

(*From p.* 13)

fully explained the background of the strike and the necessity for strike action to local church, veterans, fraternal, and civic groups. In certain cases, unions have also been able to win support for the strike (or at least neutralize the opposition) from certain enlightened elements in the business community.

"Easing the Financial Burden of Strikers— Many unions have found it possible to make special arrangements with local merchants, banks, insurance companies, and credit agencies, under which striking union members would be given consideration in meeting their financial obligations. Sometimes arrangements are made so that individuals need only make interest payments on mortgages or installment purchases without making payment on the principal amount for the loan. Local merchants will often be glad to extend credit for the duration of the strike.

"Special Assistance to Strikers— A variety of resources is often available to help individual strikers and their families suffering severe hardship during a strike. The various social service agencies, for example, stand ready to lend their assistance. The AFL-CIO Community Services Committee and its local representatives are available to help work out arrangements for such assistance.

"Utilizing Channels of Publicity —Any strike automatically becomes news. Not only newspapers, but magazines, radio, and television stations may be interested in reporting the events during the strike. Striking unions find it important to make certain that their point of view is fully understood by the newspapermen covering the strike."

Washington News Letter

(*From p.* 11)

It cannot now be foretold that this inauspicious start has set the tone which will continue throughout the session. However, there will be no shortage of issues over which the same schisms can, and no doubt will, develop. So far, the focal point of debate has been around the President's insistence on tightening up on expenditures in the hope of achieving a balanced budget. Proponents of this position, who, at the moment, appear to constitute only a small minority of the members of the Congress, call this objective fiscal responsibility; the opponents call it penny-pinching.

The general discussion of the total budget actually deals only with the broad issue. As a matter of fact, a balanced budget at the President's suggested level implies much more. It implies virtually no expansion in the defense budget despite the pressure for more rapid development of new devices, particularly in the missile category; virtually no expansion in the foreign aid program; and a retrenchment in a variety of domestic programs, particularly those which have been expanded recently in an effort to bolster the economy. It also implies little (if any) further federal help to education and to a variety of other social services.

The argument will recur each time one of these programs comes up for consideration. This is not to say that the Democratic majorities are really expected to engage in fiscal irresponsibility. Although they have already made it perfectly clear that they plan to control the course of legislation, independently of White House leadership or discipline, Washington observers are inclined to conclude that the members of the Democratic majority are unlikely to engage in any extreme programs. It is more likely that the history of each Congress since at least the 1930's will be repeated. When appropriations are finally totalled up, they will probably exceed by some significant proportion the amount that the President, and even the Congressional leaders, originally expected.

It is hoped that this development will be accompanied by less acrimony than now appears likely.

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Business and Politics

THE growing political power of labor unions is the result of effective organization at every political level, according to William A. McDonnell, president of the U. S. Chamber of Commerce. In a recent speech he pointed out that politics offers a largely unexploited opportunity for businessmen to strengthen their efforts to achieve national policies which will encourage business growth. "We must roll up our sleeves," he said, "and get to work at the precinct and ward levels where political decisions are made and office holders are chosen."

"We must pay more attention to those who are elected to Congress and to our state and municipal legislative bodies, rather than concentrate all of our efforts in trying to convince people who are already elected and already committed to a political philosophy hostile to business."

MORE recently the apathetic attitude of many businessmen and engineers in failing to give personal attention to Washington's impact on their business and professional problems was criticized by Felix A. Wormser, former assistant secretary of the Department of the Interior, and now vice-president of the St. Joseph Lead Company. Speaking before the American Institute of Mining, Metallurgical and Petroleum Engineers, of which he is a member, Mr. Wormser said that the government's role will continue to grow, making it increasingly important that its efforts be guided for the public good.

What is particularly disturbing, said Mr. Wormser, is the apparent indifference or apathy of many businessmen and engineers to what goes on in Washington. They leave this to their trade associations, which often are not in a position to function effectively. Even if they could, he said, that would not be enough; personal expressions of opinion to congressmen or senators on important mining issues are still the most effective means of getting the desired results.

The complexity of our Federal Government has increased tremendously, said Mr. Wormser, giving as an example the one department of most direct interest to the mining industry, the Department of the Interior. This has been given great authority over fields other than mining, such as fish and wildlife, Indians, public power, reclamation, etc. It is incumbent upon mining men, he said, to make sure that the important mineral resources of the nation are not overlooked. They can best serve their industry by keeping legislators and executive representatives acquainted with their views.

MINING men were urged by Mr. Wormser to take a more active interest in Washington, even to the extent of trying for public office. An engineer in a political spot where he would have to wrestle with the difficult economic and legislative problems of the mining industries should be stimulated by the challenge. He pointed out that in the last Congress there were only two representatives and two senators from engineering ranks. Lawyers predominated, and businessmen were next in number; but engineers were at the bottom of the list. The future of mining in this country, said Mr. Wormser, depends upon the manner in which the leaders in this field recognize the strong political and economic forces existing, and mold them constructively to the benefit of our nation and our industries.

Walter E. Trauffer

General view of National Lime & Stone Company's main plant building, showing the use of translucent vertical plastic panels for light.

New Ohio

ANOTHER ON THE SPOT REPORT

By WALTER E. TRAUFFER

ONE of the more interesting new plants of recent years is the new Buckland, Ohio, plant of the National Lime & Stone Company. This modern 125-t.p.h. operation can make any combination of sizes from 4-in. down to screenings, including 25-t.p.h. of agricultural limestone. Any desired product can be made on short notice and usually without changing screencloth. Much of this flexibility is due to the intelligent use of split chutes at strategic points. Unusual precautions are taken to prevent damage to equipment and injuries to personnel. The use of surge bins after the primary crusher and ahead of the secondary and reduction crushers is a definite operating advantage. The entire job is notable for its attractive appearance, both inside and outside, and the attention paid to items that are ordinarily considered minor details.

The company had an older plant, No. 1, four miles north of Buckland on leased property, which had become obsolete. It was limited in flexibility, and had a capacity of only 45 t.p.h. Growing demand in the area and the prospects for several highway projects prompted the decision to build a larger and more flexible plant on property owned by the company at the west edge of Buckland. Construction was started in October, 1956, and the plant went into partial operation on March 24, 1957, making only crusher run, No. 3, and oversize with the primary crusher and a screen over a surge bin.

The secondary side went into operation May 1, 1957, and the pulverizer was added in June. The plant was designed by R. J. Heckathorn, consulting engineer of Toledo, Ohio, who incorporated many of his own ideas of construction and control.

The deposit is the Monroe limestone found in this area, which is highly stratified and somewhat bro-

The 17-ton end-dump quarry truck discharging to the feeder ahead of the primary crusher. Note the plant-feed surge bin at the right. The plant can be seen in the background.

Crushed Stone Plant Features

- *quick flexibility*
- *protection from delays*
- *attention to details*

ken at the surface but more solid farther down. It meets all specifications for concrete and other uses. The quarry was opened up at the 25-ft. level, and another 25-ft. level is now being opened for an eventual 50-ft. face.

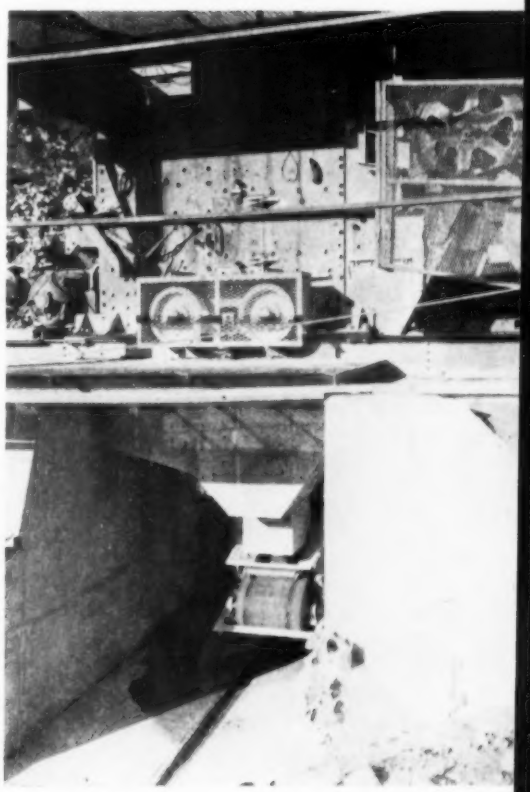
Although there is quite a water seepage problem, it is controlled through a sump. An 8-in. Gorman-Rupp centrifugal pump rated at 1,000 g.p.m. is kept going steadily for 24 hours daily. Overburden averaging 12 ft. in depth is removed by a contractor.

Drilling and blasting procedure is adapted to the varying conditions, but efforts are now being concentrated on going down to the 50-ft. level. The quarry will then be developed with an average 50-ft. face. Drilling is being done under contract by Glenn Fliehman of Woodsfield, Ohio, who also does the drilling for a number of other quarries in this area. A truck-mounted Reich rotary drill with a tricone-type bit is used.

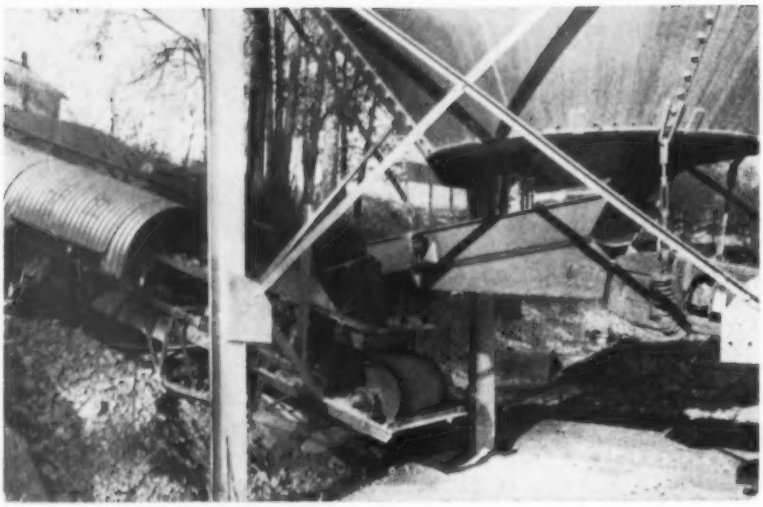
At present 25- or 26-hole double-row shots are being made about every 10 days, with about a 25-ft. face and 14-ft. burden by 16-ft. spacing. Because of the good experience with ammonium nitrate, it is used wherever water permits, up to 98 percent. Trojan TL-101, a nitro-carbo-nitrate blasting agent in waterproof cartons is used in the bottom of a hole, when wet; and Spencer ammonium nitrate in 50-lb. polyethylene bags is used for the balance.

A Trojan No. 2 Primer containing a 40-ft. Rockmaster delay electric blasting cap and with Primacord attached is placed on top of the first 25-lb. cartridge of TL-101 in each hole. Two additional primers are laced on the Primacord and placed at regular intervals throughout the remainder of the charge to insure the efficient detonation of each hole. No. 6 crushed stone (½-to 3/16-in.) is used for stemming. The shots are detonated with a 100-cap push-plunger-type blasting machine. When the 50-ft. level is reached, the same drill will be used; and shots will be made in single-row. All shots are designed and detonated by J. H. Ratchen, blasting superintendent.

Loading in the quarry is done with a Marion 93M diesel shovel carrying a 2½-cu. yd. dipper and



The impact-type primary crusher with its conveyor below. At the right is the feeder drive with the automatic overload cutoff device.



This vibrating feeder from the plant-feed surge bin connects with the 280-ft. long main plant conveyor B.

a Caterpillar diesel engine. This loads a 17-ton Euclid end-dump quarry truck which is GMC diesel-powered. With the short haul during quarry development this single unit can supply the needs of the plant, but another unit will be needed later. The haul at present is 300 to 500 ft. long and it goes up a short incline to the primary crusher.

Stone is dumped by truck on a 42-in. by 14-ft. 6-in. Pioneer Oro pan feeder, which supplies the Universal Crusher Co. No. 3645 Impactor primary crusher. The minus 5-in. crusher product is carried on a 30-in. by 180-ft. inclined belt conveyor (A) to a 60-ton circular steel surge bin, from which the plant is fed.

The feeder is driven by a 10-hp. Westinghouse motor through V-belts to an American reduction drive. The latter is connected to an original device which cuts it off in case of an overload or any blockage of the feeder. This device consists of a circular plate with an overload tripping lever and counterweights for adjustment. Any serious overload on the feeder drive pulls the lever out of a notch on the plate and shuts off the motor. The crusher operator then re-engages the feeder and runs it in reverse until the feeder has been cleared before putting it back in circuit.

Crusher drive is provided by two 100-hp. Westinghouse motors through V-belts. One of these is started up first, and the two impellor shafts are connected to each other by V-belts on the opposite side from the drives. The feeder and crusher are equipped with fittings that permit lubrication during operation. Feeder greasing is done from a panel with copper tubes leading to each bearing, and the crusher is greased through crusher fittings which are extended up above the safety guard covering the connecting belts. A 3-ton hoist over the crusher is used for handling parts; it also operates a stone hook at the feed point.

The plant-feed surge bin has a company-designed upper-level indicator which prevents overflowing. Under the end of feed conveyor A, but clear of the stone flow is a steel box 2 ft. high, supported by a steel beam across the bin. Inside the box is a mercury switch protected by a rubber flap. When the stone piles up over and into the box, the pressure actuates the switch and stops the pan feeder. The indicator is at a level which leaves ample space in the bin for the approximately 6 tons of stone in the crusher and on the belt when the feeder stops. As material is normally being drawn continuously from the bin to the plant, it usually takes about 3 minutes before the material level drops enough to start up the pan feeder automatically. When operations are normal, it is about 20 to 30 minutes between shutoffs.

Stone is withdrawn from the surge hopper by means of a 30- by 60-in. Jeffrey No. 4DS electric vibrating feeder which is set on a 10-degree slope. It discharges on the 24-in. by 280-ft. main plant

The return conveyor (C) from the secondary crusher can either discharge back on the main conveyor B or to conveyor (D) to the secondary screen. Note the enclosure for one-man elevator.

conveyor B. The minus 5-in. stone is discharged at the top of the main plant building onto a 4- by 10-ft. Deister Machine Co. 3-deck screen (No. 1). This unit has 3-, 1¾-, and ⅞-in. wirecloth on its decks. The 3- to 5-in. oversize off the top deck is chuted, *via* a stone ladder, to reduce dust, to a 25-ton surge bin. A Syntron electric vibrating feeder discharges from the bin to the 4-ft. Symons standard cone secondary crusher. The minus 1-in. product is discharged on the 24-in. by 114-ft. return belt conveyor (C) which originally discharged back on belt conveyor B. This flow can still be used when crusher run rock is desired. Conveyor C normally discharges on the 24-in. by 154-ft. belt conveyor (D) which is parallel to conveyor B and discharges to the secondary screen (No. 2) on the same floor as screen No. 1.

Three-in. to 1¾-in. rock passing over the second deck of screen No. 1 can be chuted, also *via* stone ladders, either direct to the surge bin over the cone crusher or to one of the nine 45- to 65-ton truck-loading bins. The 1¾- to ⅞-in. material passing over the bottom deck of screen No. 1 can also be chuted either to the surge bin or to another of the truck-loading bins. In each case the flow is controlled by a lever-operated flip chute under the screen.

The minus ⅞-in. material passing through the bottom deck of screen No. 1 is discharged *via* 24-in. by 26-ft. reversible shuttle belt conveyor G, either to one of the truck-loading bins, or off the other end to three options by means of selective split chutes. Option 1 chutes the material to return conveyor C and to secondary screen No. 2. Option 2 chutes the material onto 18-in. by 150-ft. stockpiling conveyor 1, which is nearly horizontal and discharges the material from a height of 30 ft. to a 5,000-ton ground stockpile. If desired, this chute can feed the material direct to the No. 9 screen, to be described later. When the splitter is moved for this flow, it automatically starts this screen. The third option, used only in making crusher-run stone, chutes this material to the surge bin over the cone crusher whenever it is desirable to regulate the flow.

Screen No. 2, a 4- by 12-ft., 3-deck Deister unit, is equipped with 1-, 7/16- and 3/16-in. wirecloth. The small amount of plus 1-in. material over the top deck can either be chuted direct to the surge bin over the cone crusher or returned by an 18-in. by 30-ft. inclined belt conveyor to main belt conveyor B back to screen No. 1.

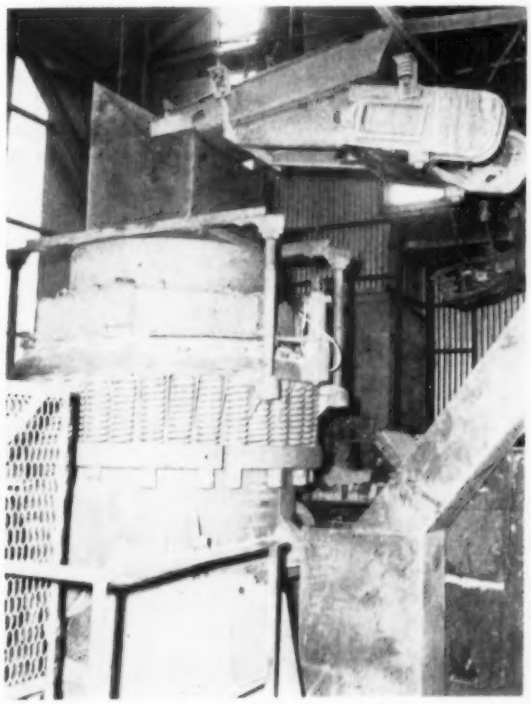
The 1-in. to 7/16-in. material over the second deck of screen No. 2 can either be chuted direct to a truck-loading bin or across the building to a 15-ton surge bin over a reduction crusher, or both. The splitter controlling these flows is operated by a truck steering wheel for accurate separation.

The 7/16- to 3/16-in. material (No. 6) over the bottom deck of screen No. 2 is usually chuted direct to a loading bin, but any desired part of it can be diverted, also by a truck wheel-controlled splitter, in with the 1- to 7/16-in. material, to make No. 46 stone for another bin.

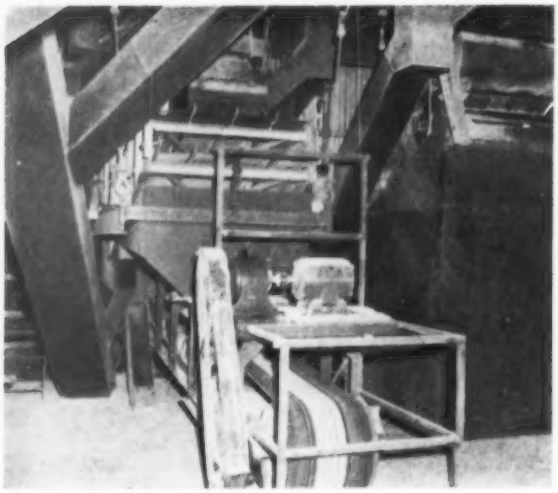
Minus 3/16-in. material through the bottom deck is fed *via* 24-in. by the 26-ft. horizontal reversible conveyor (F) either to a truck-loading bin or, at the other end, to the surge bin over the reduction crusher.

This 15-ton surge bin has a 24- by 42-in. Jeffrey No. 3H electric vibrating feeder which controls the flow to the Stedman double-cage hammermill reduction unit. The latter has two 100-hp. Westinghouse motors to drive one cage at 800 and the other at 1,000 r.p.m. The product—about 50 percent minus 100-mesh—is carried by a 12-in. by 12-ft. screw conveyor to a chain bucket

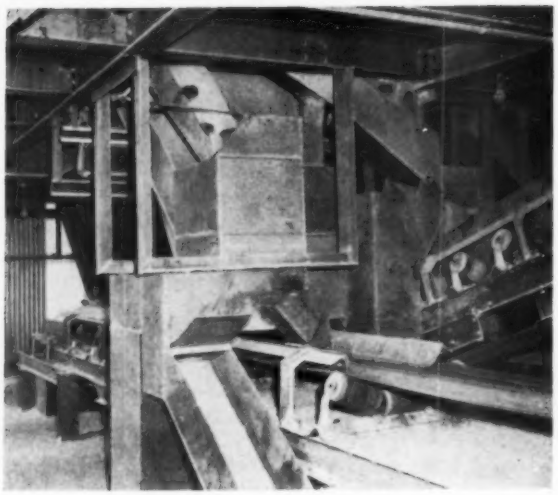
On the top floor of the main building are these two screens. The No. 1 screen (right) scalps oversize to the secondary crusher or to the bins. The No. 2 screen (left) is used for coarse sizing.



Right: The vibrating feeder under the surge bin to the 4-ft. cone secondary crusher. The feeder to the hammermill reduction crusher is in the background.



This view from behind the two finish sizing screens shows typical welded steel chutes, enclosures, etc.



Other interesting chute construction under the No. 2 screen leads to return belt B, to the bins, or to reversible conveyor F to the bins or the reduction crusher surge bin.

elevator—both Columbia Conveyor Co., units. From this point it is chuted to a 4- by 10-ft. Deister single-deck screen with 10-mesh wirecloth. Oversize goes by gravity back to the surge bin for re-crushing. Throughs, No. 10 stone (agstone), are chuted to another of the loading bins.

No. 9 screen is a 4- by 10-ft. Hewitt-Robins 2-deck unit equipped with 5/16- and 3/16-in. cloth. Both the oversize and the undersize can be carried by the 18-in. by 20-ft. horizontal belt conveyor E2, either to the storage belt conveyor or direct to conveyor C for return to screen No. 2, or both. A set screw slide divider at the end of conveyor E2 makes it possible to split this material in any desired proportions. The 5/16- to 3/16-in. material off the bottom deck of screen No. 9 goes direct to a truck-loading bin.

Nine steel truck-loading bins with capacities of 45 or 65 tons each are arranged in three rows. Trucks are loaded through special clamshell gates. These have plain greased bearings and operate very easily, closing by gravity. A 15-ton Euclid truck is used for stockpiling any sizes from the bins. Delivery trucks are loaded from stockpiles by a 2½-cu. yd. Hough Payloader and a Barber-Greene chain-bucket loader. All shipments are weighed on a Fairbanks-Morse truck scale with a Howe Weightograph.

This plant is entirely of steel and concrete construction and is unusually neat and attractive in appearance. All concrete footings are fully finished and, due to soft spots, they and the foundations rest on a solid concrete mat. Concrete floors and drains under the primary crusher, the raw surge hopper, and elsewhere provide for adequate drainage and easy cleanup. The buildings have Reeves Titekote corrugated metal roofing and siding, with translucent vertical plastic panels for the full height of the main building. Armco corrugated metal covers are used on all outdoor conveyors. Various sizes, totaling 50,000 tons are stored from a 15-ft. dirt ramp. A Sidney Grain Machinery Co. one-man elevator serves all floors of the main building. All belt conveyors and drives are Barber-Greene, and Tyler and Ludlow-Saylor wire screencloth is used.

A new 40- by 82-ft. Stransteel rigid frame steel building is being erected for a shop and equipment storage.

Washed concrete sand and asphalt sand will be made in the plant structure soon. It will be conveyed to a yard storage of approximately 5,000 tons.

Obituaries

HENRY D. MAYENSCHEIN, 72, retired general superintendent of the Fairborn, Ohio, plant of the Southwestern Portland Cement Co., died recently. He joined the company in 1925, and retired in 1956.

WILLIAM H. KILCAWLEY, secretary-treasurer of Standard Slag Company, Youngstown, Ohio, died recently at his home near Canfield, Ohio. He had been in the slag business since 1910, and was associated with the Cambria Slag Company, Sharon, Pa., the Goff Kirby Company, Cleveland, the Midland Slag Company, Youngstown, Ohio, and the Shippingport Sand and Gravel Company, Youngstown, Ohio.

MRS. GERTRUDE SPENCER, president of the Kansas City Quarries Company and also of a subsidiary, the Kansas City Concrete Company, died last December. Mrs. Spencer succeeded her husband in the quarry business after his death in 1939.

THOMAS L. CARNES, sales manager for the Arundel Corporation, died on December 20, after an illness of several months. He joined the Arundel Corporation in 1938 and has been in charge of the sales of concrete aggregates and road materials.

First Portland Cement Plant In California Still Standing

Courtesy of Oliver E. Bowen Jr.

About 66 years ago this building housed the first portland cement operation in California. The structure, near Jamul, Calif., composed of field stone blocks, is still in good condition.

SKIES are serene and the temperature is balmy all year on the vast and picturesque Daley Ranch near Jamul in the San Diego back country of California. Hidden from the road is the spot where California's portland cement industry was launched in 1891. In that year a shaft-kiln plant with a daily capacity of about 150 bbl. was placed in operation by a concern known as the Jamul Portland Cement Works.

The Jamul operation lasted only a year or so and then closed. Its demise was attributed to stiff competition from low-cost cement from England and the Continent.

The "birthplace" building still stands, however, in an excellent state of preservation, as the accompanying pictures show. The kiln building is about 36 ft. wide by 15 ft. deep, exclusive of the stack, which rises about 30 ft. above the structure. The massive part of the building is of roughly-hewn field stone blocks laid up in mortar. Stack and upper kiln linings appear to consist of common red brick, while the hot-zone linings are of English fire-brick.

The first production of *natural* cement in California began earlier, however. The year is believed to be about 1860, and the plant was located near Benicia, in Solano County, east of San Francisco. Output continued until about 1890.

Courtesy of Oliver E. Bowen Jr.

A closeup of the "birthplace of portland cement" shows some of the details of the structure, which had kilns lined with common red brick and hot-zone linings of English fire-brick.

Morton Salt Company Mine To Have 2,000-Ft. Shafts

Sinking of two 2,000-ft. shafts is nearing completion at the Fairport Harbor Mine of the Morton Salt Company near Grand River, Ohio. The concrete-lined shafts will make available a thick vein of high-grade commercial salt.

The production shaft will be driven 80 ft. lower than the main salt vein, to permit gravity loading into the shaft conveyance. Winston Bros. Company, Minneapolis, engineers, are doing the work.

Also under construction is a mill for crushing and processing the salt. Underground mining crews will build an elaborate system of roadways leading to the "salt rooms," and equipment will be lowered for removing the salt. The expected production goal is 500 t.p.h.

Construction is to begin soon on a multimillion-dollar plant for the National Gypsum Company near Lorain, Ohio, according to Melvin H. Baker, board chairman. About 500 workers will be employed in making wallboard, plaster, and other gypsum products.

Operations at Kuwait comprise basic part of development program

Lime and Sand-Lime Brick

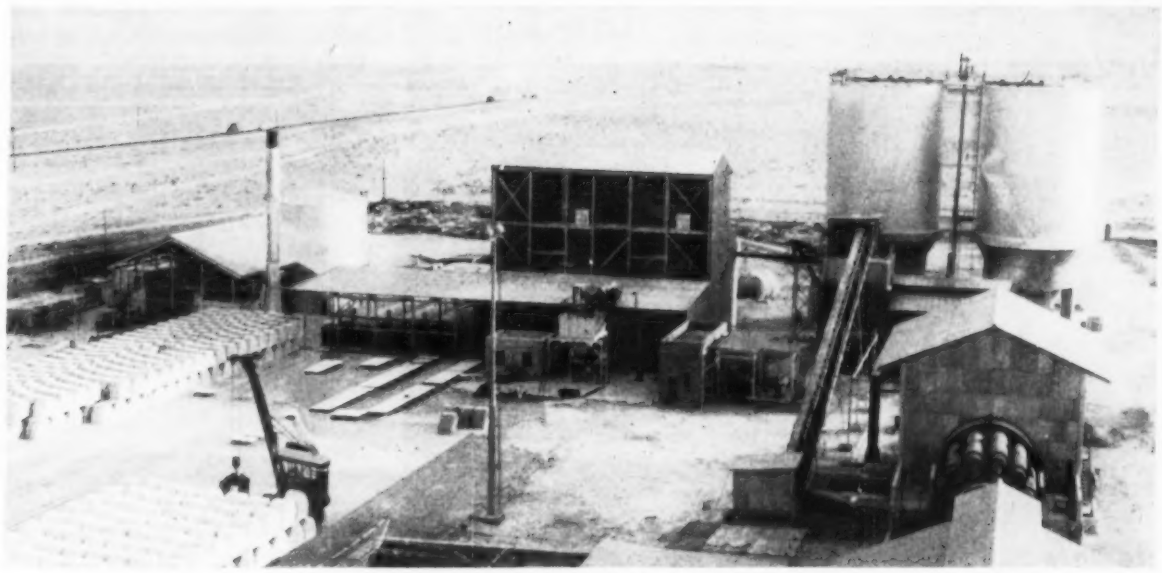
By JOHN GRINDROD, B.A. (COM.)

A view of the quarrying operation at the sand deposit along the beach.

ANOTHER P&Q EXCLUSIVE

PROBABLY one of the most exciting things, architecturally, now happening in the Middle East is the redevelopment and expansion of the now world-famous oil city of Kuwait; and helping to make this possible is a new and fully-integrated sand-lime brick plant which makes use of local materials. It is believed to be one of the very few plants with its own lime production unit integrated as a part of the process on the same site.

With the rapid development of its oil industry by the Kuwait Oil Company, a joint British-American enterprise, Kuwait has recently become the richest country in the world for its size. Under an agreement reached in 1951 between its ruler, His Highness the Shaikh, Sir Abdulla As Salim As Subah, K.C.M.G., C.I.E., and the oil company, the former became personally



This general view of the operation at Kuwait shows a section of the storage yard and a part of the plant. At the right a chain conveyor delivers the ground material to one of two 1,500-ton capacity storage silos, which are 80 ft. high and 35 ft. in diameter.

Made from Desert Sand

entitled to an equal share of the company's profits. From this annual income of many million pounds from oil royalties, he is devoting a good deal toward improving the living conditions of his people and the rebuilding and expanding of the city of Kuwait, which he aims to make the best planned in the Middle East.

This development plan has four basic objectives: (1) the development of an efficient road system; (2) the redevelopment of the central area of the old town inside the wall to provide good sites for important public buildings and the replanning of the bazaar and commercial areas; (3) the expansion of the city outside the wall by developing a number of neighborhood units and the expansion of two existing villages; and (4) the development of specialized industrial, educational, and health zones along the coastal road outside the city.

To carry out this extensive program, building materials of all kinds are needed, and among them many millions of bricks a year. When the planning was begun, however, only imported clay bricks from Iraq were available; and as far as had been ascertained, the indigenous materials were not good for brick-making.

Sand and Lime Winning

In 1952, a geological survey was carried out, under the direction of R. Fitzmaurice, M.I.C.E., M. Cons. E., then scientific advisor to the Shaikh. This survey revealed the presence of unlimited quantities of sand and gravel. This material was often gypsiferous, and almost all the sand of a fineness usually regarded as unsuitable for building purposes. Thin seams of clay were found which had been used for making bricks of poor quality; but the calcareous mud and silt found on the neighboring islands were quite unsuitable for the purpose, being highly saline. The gypsum discovered was impure, and building stone was virtually absent.

It was discovered by analysis, however, that shell fragments and unconsolidated oölites contained in much of the beach sand caused it to be highly calcareous, and investigations were undertaken by the Building Research Station in the United Kingdom into the possibility of using the lime content of this beach sand in the production of sand-lime bricks. It was found that bricks of an average compressive strength of 3,600 p.s.i. could be made by a now patented method. This process involved calcining the sand and grinding it until the residue on a 100 B.S. sieve was 40 percent, mixing this with twice its own weight of uncalcined sand, hydrating, applying pressure at 2 tons s.i. with a moisture content of 6 percent, and autoclaving at a full pressure of 180 p.s.i. for 2 hours. Later laboratory experiments confirmed that excellent sand-lime bricks could be made from the materials available at Kuwait, if all stages of manufacture were adequately controlled.

The kiln installation, seen from the firing end. From left to right, the following are seen: the dragchain conveyors, the kiln drive station, the charging end—surmounted by the storage hopper—the feed conveyor, and the kiln stack.

However, since the calcareous beach sand was the only material in Kuwait of a grade suitable for concreting sand, a switch had to be made to alternative materials which could be used in a plant with a planned output of 40,000,000 bricks a year.

Surveys were therefore concentrated on (1) finding suitable deposits, which, although of a poor grade for normal building purposes, were free from objectionable impurities and (2) locating deposits which were particularly rich in calcium carbonate. Fortunately, a large dune-like deposit of fairly pure sand, estimated to contain over two million tons, or a 20 years' supply at full production of the proposed plant, was found. Of very fine texture and varying in grading, the sand yielded a sieve analysis of which the following was typical:

B.S. Sieve Size	% Passing
$\frac{3}{16}$ in.	100
No. 7	95-99
14	85-90
25	80-85
52	75-80
100	50-60
200	2- 8

Two further deposits were also discovered nearby, and since the first deposit lay alongside the main road to the oilfields and near to the Kuwait town development area, it was decided to locate the brick manufacturing plant on the northern boundary of the deposit. Because the sand deposit was shallow and of variable depth, it was planned to remove it by an excavator, which would load direct into end-dump trucks for transport to the plant. This method was considered cheaper and more flexible than the use of a conveyor belt system.

In the search for a suitable calcareous material, a deposit was found about 20 miles from the proposed site of the brick plant. Here there were dunes of oölitic material with 10-ft. high ridges cemented by interstitial lime. Made up of individual grains composed of a chemically precipitated calcium carbonate, this limestone is of recent origin and, in fact, is still being formed. There is also a 3-ft. thick bed of hard shelly limestone throughout most of the area.

Specimens of this material were sent to Britain and Denmark for testing, and it was found that its calcium carbonate content varied from less than 20 percent to 98 percent and that the amount of impurities present also varied considerably. It was considered, however, that lime with satisfactory slaking qualities could be burned from this material, although material of less than 40 percent carbonate content was hardly worth winning.

Of material with an average of 66 percent carbonate content, it was estimated that there was a 1,500,000-ton supply or sufficient for 20 years, at least, even if only half the lime produced were used for brick making and the rest as a substitute for cement in mortars and plasters or exported. One of the stipulations in respect to the lime plant was, indeed, that it should be able to produce twice the amount of lime actually required for brick making. Maximum allowable impurities were set at 3 percent magnesium carbonate as MgO, 1 percent sulphates as SO_3, and 0.5 percent chlorides as Cl.

In the case of both sand and lime, the great variability of the deposits necessitated very detailed examination. Samples were taken from trial pits and boreholes in order to ensure the sufficiency and regular flow of reasonably consistent raw materials to the plant.

Because the lime deposit was in an isolated area and away from the main plant, and because maintenance of equipment would be difficult, it was decided to employ only drills and excavators at the quarry and to install a crusher at the main plant. The material was to be transported to the brick works by end-dump trucks. Since much of the excavated material would be wet on extraction, having been taken from below sea level, provision was made for stockpiles to be built up at the quarry to allow it to drain and dry.

Excavation at the lime deposit is carried out by dragline excavator. There is no overburden, all of the material being usable as recovered. The only criteria of suitability are the carbonate content and the amount of impurities present. By pre-planning and detailed analysis it is possible to decide at what depth to excavate in the various parts of the deposit; and approximate checking is possible by visual means.

The rocky parts of the deposit and the hard shelly strata can be avoided when using the dragline and can be tackled later by small-scale blasting. No difficulty is anticipated through flooding as the

rise and fall of the tide is quite small, and the deposit lies in the shallow part of Kuwait Bay, where high seas are unusual. No attempt can be made to keep the workings dry, and for this reason stocking is necessary both at the deposit and at the plant, so that the material can drain.

Sand and Lime Processing

On arrival at the plant, the limestone is fed either direct from the rear-dump trucks to a swing hammermill or to a stockpile from which it is bulldozed as required. Flow through the 40-t.p.h. hammermill is controlled by a laminated feeder, and the ¾-in. or smaller crusher material is carried by belt conveyor to a stockpile which also receives run-of-quarry oölitic sand and other fine material that does not need crushing.

Reclamation from the stockpile is by way of a tunnel belt conveyor served by a vibrating feeder. The material is delivered to the kiln hopper, which can take a 24-hour supply, and from which the kiln is fed by a closely controlled laminated feeder. Check samples are weighed regularly. The rotary kiln is some 250 ft. long and 7 ft. 10½ in. in diameter at the charging end, widening to 8 ft. 10 in. in the burning zone. It is lined with General Refractories Hyslin attrition-resistant bricks with Alumantine 60 to 65 percent Al_2O_3 bricks in the burning zone. It is driven by a 60 hp. variable-speed electric motor.

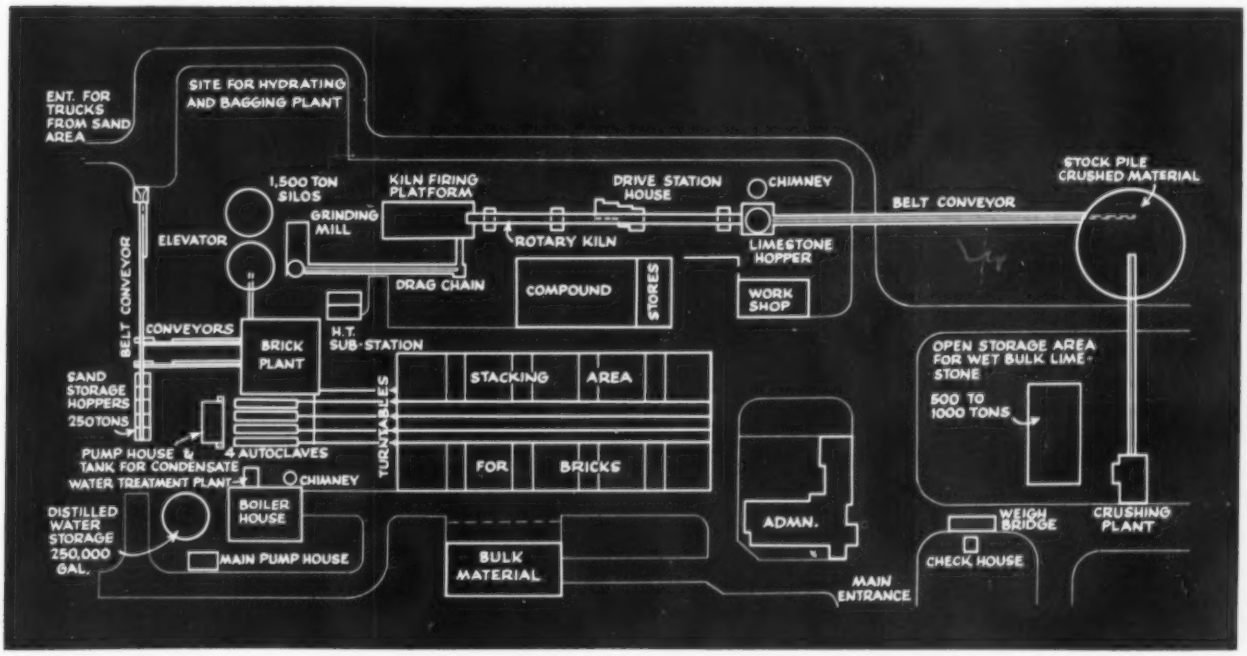
Since plenty of natural gas was available, it was used as a source of fuel for the boiler house and kiln, being supplied at a pressure of 165 p.s.i. Fuel economy was not a factor of great importance. It permitted a saving in capital cost and in complexity of plan design and operation, especially of the lime kiln, although special precautions had to be taken in ensuring cleanliness of the gas supplies and freedom from abrasive material.

At the kiln, the gas is reduced by stages to a pressure of 4 to 6 in. water gauge before being passed to the mixing chamber. Safety devices are provided to guard against excessive fluctations in gas or air pressure and against electric power failure. Spent gases are exhausted to atmosphere through a 130-ft. high natural-draught type chimney of welded steel construction. This stack is lined with General Refractories GR 23 HT insulating firebricks and Amberlite 43 diatomaceous insulating bricks. A manually-operated damper is used for draught control.

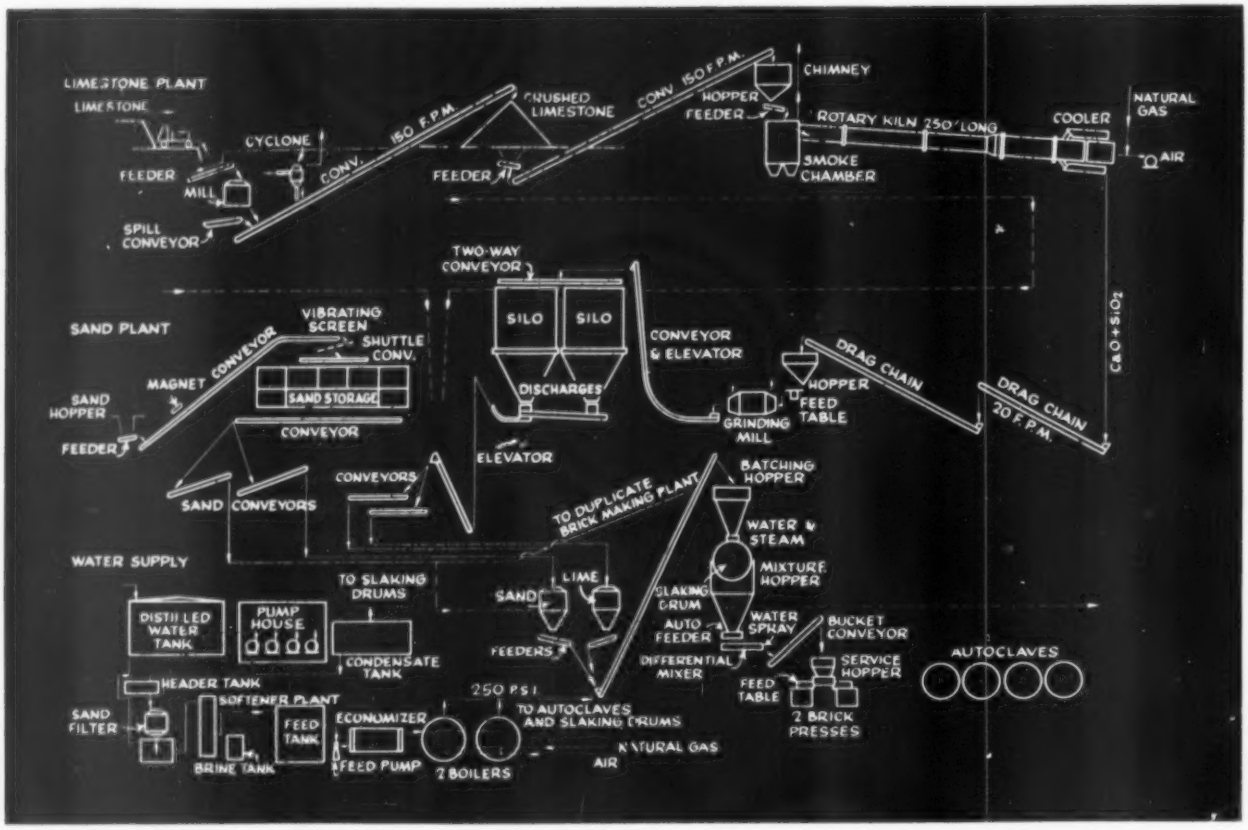
Burned material from the kiln is discharged from F. L. Smidth Unax coolers onto a series of enclosed drag-chain conveyors which pass the lime forward to a surge hopper. From this point it is fed by feed table to a Unidan mill for grinding to a fineness of 1 percent retained on a 30-mesh sieve. The mill is driven from a 200 hp. electric motor, and the charge of grinding media in the two compartments can be varied to give grinding flexibility.

A Redler chain conveyor delivers the ground material to one of two 1,500-ton capacity storage silos (about 8 days' production). These are 80 ft. high and 35 ft. in diameter and consist of a reinforced concrete cone supporting a welded steel barrel. From these storage silos, the lime is withdrawn by Redler bin dischargers fitted with arch breakers and is passed by a series of Redler conveyors to two quicklime storage hoppers in the brick-making plant.

No difficulty has been experienced in slaking the lime; and initial experiments showed that, with the type of limestone being fed to the kiln, a medium hard-burned lime gave the best results in brick-mak-



The general site plan of the Kuwait operations.



Flow diagram of the lime and sand-lime brick plants at Kuwait.

ing. The degree of burning is largely a matter of judgment, but it can be checked by achieving a residual carbonate content of less than 1 percent, as determined by an F. L. Smidth calcimeter. It has not been found possible to devise accurate methods of recording the actual temperatures of the material in the burning zone.

Provision has been made for the future installation of a lime hydrating and bagging plant, but its erection has been postponed until the Government of Kuwait can assess domestic demand and the chances of exporting it.

To meet 24-hour-per-day operation of the kiln with allowance for maintenance and re-lining shutdowns, an input of about 300 tons of run-of-quarry material containing an average of 66 percent calcium carbonate a day would be required to produce 100 tons of CaO a day, the balance of the input being represented by 100 tons of silica and other solid impurities and about 100 tons of CO_2. With experienced burners, the input could be reduced to about 100 tons a day, and this will be necessary pending the installation of the hydrating plant.

The limestone crusher and ancillary machinery, the kiln and associated machinery, and the Unidan mill were supplied by F. L. Smidth & Co. Ltd.

From its reception hopper at the plant, the sand is transported by belt conveyor to a series of storage hoppers. Provision has been made for extracting any pebbles, tramp iron, or other material which would affect the brick-making process. About 20 tons of sand, or 8 hours' full production supply, can be held in the storage hoppers. Withdrawal is effected through simple valves onto a horizontal belt conveyor running under them. From this conveyor, the sand is ploughed off to feed another belt which delivers to a 3-ton storage hopper in one section of the brick-making plant, while the carry-over is similarly fed to another section.

Brick Plant

Two separate sections were planned for the brick-making plant, so that, if necessary, only one-half of the plant could be operated economically. It was expected that the 40,000,000 bricks a year immediately required by the Government of Kuwait would eventually be reduced when the initial development plan had been accomplished, and the plant was arranged so that maximum use could be made of the machinery during the first ten years and so that it would be flexible enough to cope with a fall-off in demand if and when this came. Initial operation envisaged the production of 2,500 bricks an hour from each of four presses working for two 8-hour shifts over a five-day week; this represents 800,000 bricks a week, or 40,000,000 a year.

Major equipment in the brick plant includes two duplicate lines of slaking drums, differential mixers, brick presses, and autoclaves.

In planning the plant, it was anticipated that, using about 7 per-

cent of lime (as Ca) in the sand-lime mixture, bricks with an average crushing strength of 1,900 p.s.i. could be produced by autoclaving for four hours at 250 p.s.i. Such bricks would be sufficiently strong for normal building uses; but, should higher strengths be required, it was expected that more CaO would be used in the mix.

During the first 23 days of production, when a reasonable degree of supervision was maintained, about 1½ million bricks were made, of which about 1,300 selected at random, were tested to give the following results:

Average Crushing Strength (wet) p.s.i.	No. of Days Production
Below 2,800	Nil
2,800-2,899	3
2,900-2,999	3
3,000-3,099	3
3,100-3,199	7
3,200-3,299	1
3,300 and above	6

The CaO content of the mix varied between 7.2 percent and 10.5 percent, averaging 8.6 percent.

Experiments during production showed that bricks of good strength, in excess of 2,000 p.s.i. (wet) could be made with CaO content of less than 7 percent, but that low green strengths made such bricks liable to damage before autoclaving. It was also found that when 7 percent CaO mix was used, autoclaving time could be reduced to three hours to produce common bricks of less than about 2,500 p.s.i. crushing strength. It was considered that up to 10 percent CaO might be used to make bricks of engineering strength in excess of 2,900 p.s.i.

The output from the plant, which consists mostly of bricks colored with such tints as green, red, and buff, is already being used for many important construction projects in Kuwait, giving results reportedly comparable with brick-work in any other part of the world.

The consulting engineer for the Kuwait sand-lime brick plant was R. Fitzmaurice, M.I.C.E., M. Cons. E., of Cyprus, who was assisted by G. G. Rice. Although working for the most part in Britain, Mr. Rice made the detailed survey of the sand deposits in Kuwait. Messrs. George Wimpey & Co. Ltd. of London, England, were responsible for the detailed design of the plant and the analytical work.

Dewey Portland Cement Co. To Erect $10,000,000 Plant

Dewey Portland Cement Company has purchased land costing approximately $1,000,000 for the site of a new $10,000,000 cement plant to be located near Tulsa, Okla.

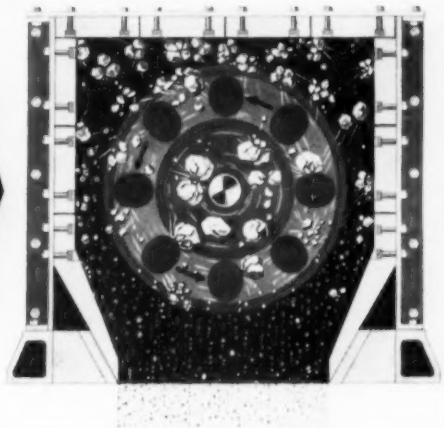
Output of the plant will be 1,250,000 bbl. a year. It is estimated that limestone reserves will produce 350,000,000 bbl. of cement.

Dewey Portland is presently operating a plant at Dewey, Okla., which has an annual capacity of 2,000,000 bbl., and a second operation at Davenport, Iowa.

CHALMER F. AYERS, has been named assistant treasurer of the Gibsonburg Lime Products Company, Gibsonburg, Ohio.

SIZE AND UPGRADE YOUR AGGREGATES FOR BOTH CONCRETE AND BITUMINOUS MIX with the

STEDMAN CAGE MILL



The Stedman Single-Cage Mill reduces Gravel and Stone, either wet or dry, via the Internal-Impact Principle. See Fig. 523 above. It pulverizes unsound material to be passed off with fines—the discharged product going to wet screens, log washer, jigs, or heavy media process.

The Stedman Single-Cage Mill not only upgrades your product, but also gives the greatest percent of crushed surfaces for Black Top Mix. Example: "Crush your — 2" + ¼" including pea gravel to a product of ¾" x 0, screen out minus ¼" sand and furnish a specification product for Bituminous Mix with 65 to 100% crushed particles."

Variation of speeds and type of cage result in a wide variety of product sizes.

Wire or write for information.

125th Anniversary STEDMAN 1834 1959

STEDMAN FOUNDRY and MACHINE COMPANY, INC.

Subsidiary of United Engineering and Foundry Company

AURORA, INDIANA, U. S. A.

Enter 85 on card, page 123

Tarmac's Slag,

By ROWLAND GREEN
Chief Engineer
Contractor's Plant Department
Stothert & Pitt Ltd.
Bath, England

ANOTHER P&D EXCLUSIVE

AN organization for the production and distribution of 15,000 tons per week of processed blast-furnace slag was last year brought into being at Teesport on the northeast coast of England, by Tarmac Roadstone Ltd., the foremost slag processors in Britain.

The processing plant involves crushing, screening, and storage units, as well as facilities for the manufacture of tar and bituminous macadam, asphalt, water-bound macadam, aggregate for surface dressing, railroad ballast, filter media, and in fact almost anything for which slag is suitable. In addition, it has direct ship-loading conveyors for aggregates to be shipped around the coast of Britain. The plant is set mainly in a straight line between the steel company's slag pits and the Tarmac Roadstone Ltd. ship-loading wharf. The coating plant is at right angles to the main building.

The slag comes from two new furnaces of Dorman Long Ltd. at Cleveland, and the principal processing plant was designed and erected by Stothert & Pitt Ltd., Bath, England, who were also responsible for the electrical control equipment. All the building and civil engineering work was carried out by Tarmac Civil Engineering Ltd., and the whole project was directed by the Tarmac Roadstone Ltd. Development Department.

Before passing on to a detailed description of the plant, we shall mention one or two outstanding points. Advances in the design of quarry plant, and especially of coating plants, have been very considerable over the last several years; and at Teesport tendencies which were apparent in earlier designs have been developed even further. In particular, control of the various operations of the plant is largely automatic, and the labor force needed to run it is therefore small; reduction in labor was one of the basic aims of design.

A second aim was to achieve consistent accuracy in the various screening and batching operations, particularly in the coating plant, where present-day practice demands a high standard.

A third factor was the need for flexibility in delivering stone or coated stone from the plant according to varying requirements, and particularly for changing rapidly from one requirement to another.

The crushing and screening section of the plant can be controlled by a foreman and four workers, one each at the feed hopper, the mill house, the selector screening unit,

An aerial view of the Teesport operations of Tarmac Roadstone Ltd., with the loading dock in the background and the aggregate-bituminizing (coating) plant at the right.

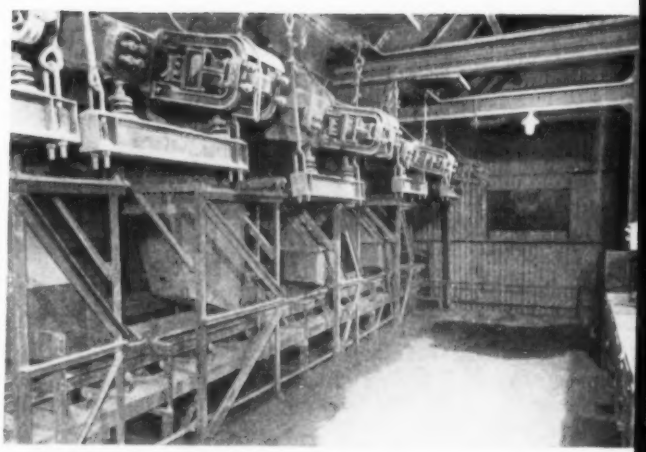
Bituminizing Operation

Latest in series of strategically located British plants serves large area

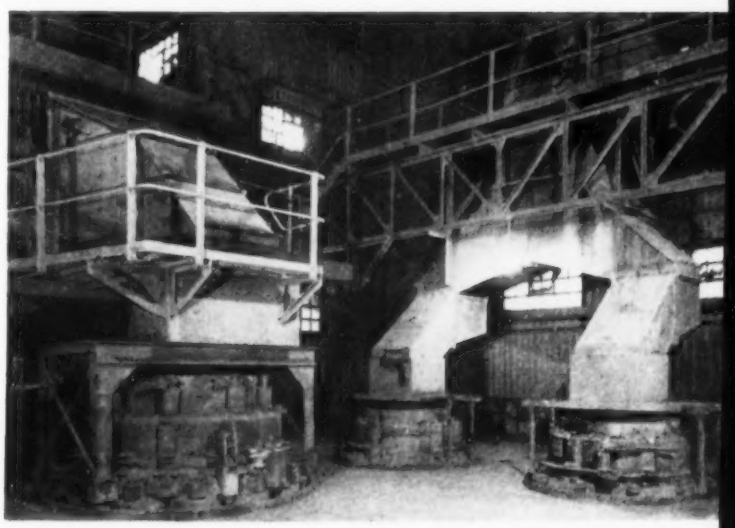
and the main screening unit. For the operation of the coating plant two more men are required, one for the two grading, heating, and mixing units, the other at the lorry-loading bays to deal with traffic to the six 20-ton mixed materials hoppers.

Two men are required when ships are being loaded, one to set the feeders under the main storage bins, and one for the wharfside conveyors and ship-loading chute. This makes a total of a foreman and eight men when a ship is being loaded and the coating plant is in full production. In addition, there are skilled technicians to attend to the maintenance and servicing of the equipment, and also the personnel involved in handling the slag before it enters the plant.

Accuracy and flexibility are achieved by the detailed layout, as here described, and also by certain more general factors of design. The most noteworthy is the selector screening unit. Here, a primary screening is effected, and excess quantities of any specific fraction are returned to the mill house for recrushing. This procedure has two advantages: (1) the main screens are submitted to a constant load of material—since there is no recircu-



The five feeders under the bins, which can send any desired gradations of the material back to the crushers or on to the final screen house.



The three cone crushers—one 5½-ft. extra coarse (left) and two 4-ft. short-heads (right)—which do all the reduction in this plant.

lation from them—which results in more accurate screening and less wear on the screens; and (2) the crusher installation is thus centralized and the crushed slag is handled more economically.

The design of the coating plant also calls for comment; the complicated sequences of operations carried on here are centrally controlled, and for this class of plant the standards of cleanliness and of layout for inspection and maintenance are high.

Direct loading into ships is also an important service effected at the plant. There is a berth with loading conveyors in the Tees River which permits ships up to 3,000 tons to be loaded with graded slag and turned around in a tide. It will be appreciated that slag is competitive with natural stone in areas within a certain radius of the plant where it is produced. Transport by ships, especially in 3,000-ton vessels, which are larger than those used previously for this duty and which consequently offer more economical transport, extends this range.

The Teesport plant will thus operate in conjunction with two plants on Thames-side at Deptford and Creekmouth, and others at Ipswich, on the east coast of England and Dover, Shoreham, and Poole, on the south coast. Storage and distribution is carried out from these latter points, but the present scheme also included the construction of a new plant at Deptford for screening, storage, and coating of slag. This new plant has now commenced production and is of the same general design as the storage and coating plant at Teesport. Some of the Teesport slag, incidentally, is also exported to countries in Europe which lack indigenous roadstone.

SLAG PLANT

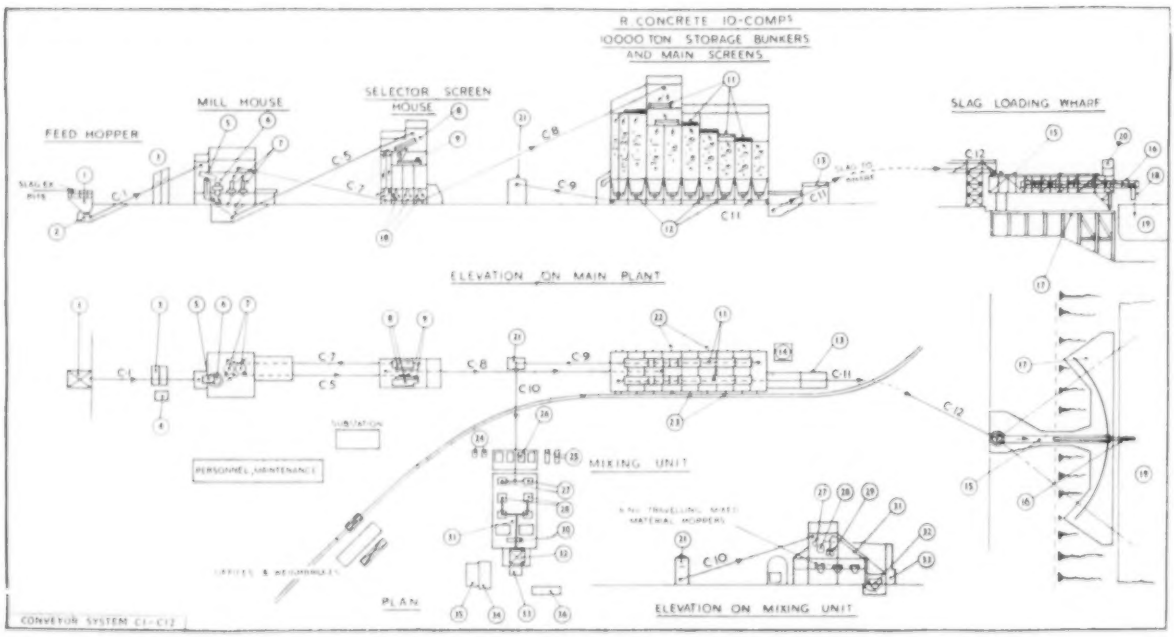
Pit Trains of 20-ton rail-mounted power-tipping slag cars from the furnaces run on two sets of raised tracks between two cooling pits, each 1,900 ft. long by 125 ft. wide and having an average depth of about 10 ft. Slag is recovered from the pits by two 54 RB excavators and loaded into tipping lorries for transport to the crushing, screening, and mixing plant.

Mill House All crushing is concentrated at one station. This simplifies supervision, maintenance, and housing. Lorries discharge the slag from the cooling pits into a 50-ton capacity ground hopper. A vibrating feeder on this hopper passes the material at a controllable rate up to 300 t.p.h. onto the tail of a conveyor and up to the top of the mill house. The material passes under a magnetic separator mounted above the belt to remove any tramp iron. Before primary crushing, much of the material would pass a 4-in. screen. The largest cube size generally delivered is about 8-in., but ocasionally slabs up to 24 in. long are encountered.

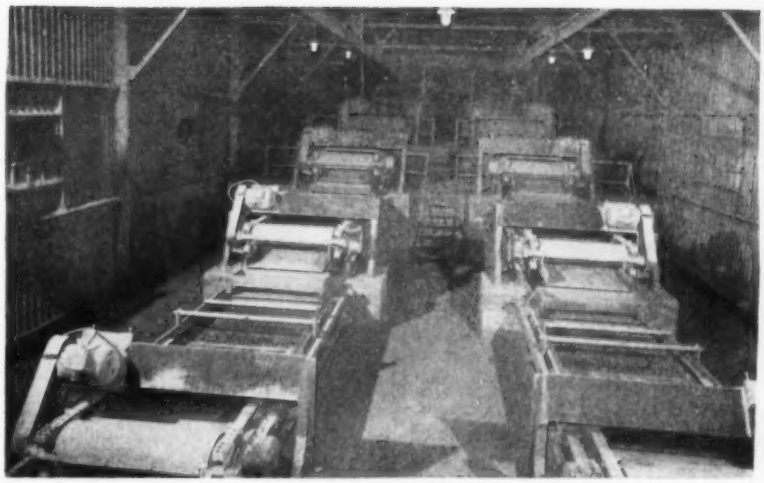
Three Nordberg Symons cone crushers are installed in the mill house—a 5½-ft. extra coarse crusher as the primary machine and two 4-ft. shorthead secondary cone crushers. The largest of these machines is fitted with wedge adjustment for quick setting and is driven through a "Twiflex" clutch mounted on a jack-shaft with V rope drive to the motor. Each of the two 4-ft. secondary crushers is driven through a Twiflex clutch on its motor shaft with a V rope drive to the crusher countershaft.

Material is discharged from the conveyor onto a 72-in. by 144-in.

Flowsheet drawing of the slag and aggregate bituminizing plant of Tarmac Roadstone Ltd. at Teesport, England. See opposite page for legend.



Some of the 14 single-deck horizontal vibrating screens which can make any desired sizes of slag.



single-deck Robins Gyrex screen with 4-in. square mesh. The minus 4-in. material is delivered by chute to the tail of the main discharge conveyor from the mill house. The 4-in. material is crushed in the primary machine and discharged into the same chute. The purpose of the two secondary crushers which also deliver into the common chute will be mentioned later.

Selective Screening The crushed material from the mill house is conveyed to the selector screening unit and discharged through a breeches chute to two sets of screens. Each set consists of a double-deck 72-in. by 192-in. Gyrex screen and a 60-in. by 192-in. Symons single-deck screen. Two cuts are taken from the double-deck screen and three from the single-deck, including the reject over the end, making a total of five sizes. The screens are mounted above a five-compartment storage bin, each compartment having a capacity of about 100 tons.

Material is separated into the following sizes for delivery into the storage compartments: minus 4 in. plus 2¼ in.; minus 2¼ in. plus 1½ in.; minus 1½ in. plus ¾ in.; minus ¾ in. plus ½ in.; and minus ½ in. An electric vibrating feeder is fitted at the bottom of each compartment. On the four compartments for plus ½-in. sizes, materials discharge through bifurcated chutes. One leg of each bifurcated chute and the minus ½-in. discharge chute deliver onto a conveyor leading to the final screening plant at the top of the main storage house.

The other leg of each bifurcated chute delivers onto a second conveyor leading back to the mill house. The bifurcated chutes are fitted with Thrustor-operated diverting plates which are actuated to deliver the material onto one or the other of the conveyors. Thus, when there is an increased demand for the smaller sizes of material, any selected size can be returned to the mill house for recrushing in the two 4-ft. shorthead Symons cone crushers. The recrushed material then rejoins the first delivery conveyor for return to the selector screening unit.

With this arrangement of what may be termed closed-circuit selecting and recrushing, it is possible to send forward to the main storage hoppers a bulk of the particular sizes required together with the minus ½-in. fraction. It may be required, for instance, to produce a quantity of minus 4-in. plus 2¼-in. material but to reduce the bulk of the throughput to small sizes. In such a case, the primary scalping screen will enable the minus 4-in. material in the feed to be taken directly to the selector unit, leaving the primary crusher to be adjusted, if required, to a setting suitable for the final production of the finer fractions. This arrangement will allow the production of a quantity of larger material while the primary crusher works at an efficient setting for the requirements of the bulk of the throughput. If required, the whole of the 300-t.p.h. throughput could be reduced to minus ¾-in., and it is estimated that of this total about 220 tons would be ½ in.

Panels with pushbutton control and tonnage indicators are mounted next to each of the feeders of the selector screening unit.

Final Screening and Storage The main storage hoppers are approximately 90 ft. high and are constructed of reinforced concrete carried in *in situ* piles. Crushed slag was used as coarse aggregate for some of the concrete work. The main screens are mounted above the hoppers, and the overall height of the building is approximately 120 ft.

Final separation at these screens into ten sizes is done by 14 single-deck Symons vibrating horizontal screens in two lines of seven; the hoppers vary in size according to the anticipated sales requirements. They incorporate compartments to take 545 tons of minus 4 in. plus 2¼ in.; 560 tons of minus 2¼ in. plus 1½ in.; 1,175 tons of minus 1½ in. plus 1 in.; 1,035 tons of minus 1 in. plus ¾ in.; 840 tons of minus ¾ in. plus ½ in.; 925 tons of minus ½ in. plus ⅜ in.; 980 tons of minus ⅜ in. plus ¼ in.; 1,085 tons of minus ¼ in. plus 3/16 in.; 1,290 tons of minus $\frac{3}{16}$ in. plus ⅛ in.; and 1,210 tons of ⅛ in.— a total of 9,645 tons.

Each of the ten main storage hop-

1	50 TON DUMP HOPPER
2	ELECTRIC VIBRATING FEEDER
3	2-72" DIA. OVERBAND MAGNETS
4	MAGNET CONTROL HOUSE
5	72" - 144" S.D. GYREX SCALPING SCREEN
6	5½ FT. STANDARD SYMONS CONE CRUSHER
7	2-4" SHORT HEAD SYMONS CONE CRUSHERS
8	2-72" - 192" GYREX SCREENS
9	2-60" - 192" NORDBERG SCREENS S.D.
10	5-ELECTRIC FEEDERS & 4-2 WAY CHUTES TO C.7 OR C.8
11	MAIN GRADING SCREENS, 2 BANKS
12	ELECTRIC GRADERS TO C.9 & ELEC. FEEDERS TO C.11
13	AUTOMATIC WEIGHING TOTALIZER
14	SWITCH HOUSE
15	SLEWING GANTRY CONVEYOR
16	SHUTTLE CONVEYOR
17	REINFORCED CONCRETE JETTY
18	TELESCOPIC LOADING CHUTE
19	BERTHED VESSEL
20	LOADING CONTROL CABIN
21	TRANSFER TOWER TO MIXING UNIT
22	ROAD WAGON LOADING CHUTES
23	RAIL WAGON LOADING CHUTES
24	2-1000 GAL. FLUX OIL TANKS
25	2-2000 GAL. FUEL OIL TANKS
26	3-6000 GAL. & 1-4000 GAL. CLARMAC HEATERS
27	2-60 CUBIC FEET BATCH WEIGH HOPPERS
28	2-60 CUBIC FEET BATCH HEATERS
29	2-60 CUBIC FEET PADDLE MIXERS
30	CONTROL DESK
31	REDLER ELEVATOR FOR FILLER
32	75 CUBIC YARD FILLER HOPPER
33	DUST COLLECTING UNIT FOR BATCH HEATERS
34	DUST FILTERS
35	SLUDGE PENS
36	WATER STORAGE TOWER

pers has two outlets at the base, each line of ten outlets delivering onto a separate conveyor system. One system is for direct delivery to the loading wharf, and the other to the coating plant. Manually-operated side chutes feed material to rail or road trucks.

Loading Out Each of the ten outlets serving the wharf conveyor system is fitted with a Locker electric vibrating feeder with an adjustable capacity up to 250 t.p.h. By selecting the sizes and setting the feed rate, any required combination of materials can be delivered to the conveyor up to a total of 400 t.p.h.

The conveyor, which is fitted with a totalizing weigher at the outgoing end of the house, elevates the material to deliver it to a second conveyor at a transfer tower. This second conveyor delivers the matrial to the loading wharf conveyor installation. The transfer tower will be used later on to divert materials to a stockyard. When this stockyard is brought into use, a stock-loading unit will be built, just ahead of the main storage house.

The second row of ten outlets serves the conveyors leading to the coating plant. The outlet for the largest fraction is controlled by an electric vibrating feeder with a maximum feed rate of 110 t.p.h.

The other nine openings in this row are controlled by 60-cu. ft. batch rotary metering feeders, or "proportioners," as they are sometimes called. These devices give an accurate proportioning of materials from the storage bins; an error of $\pm$ ¾ percent is not exceeded in normal operation.

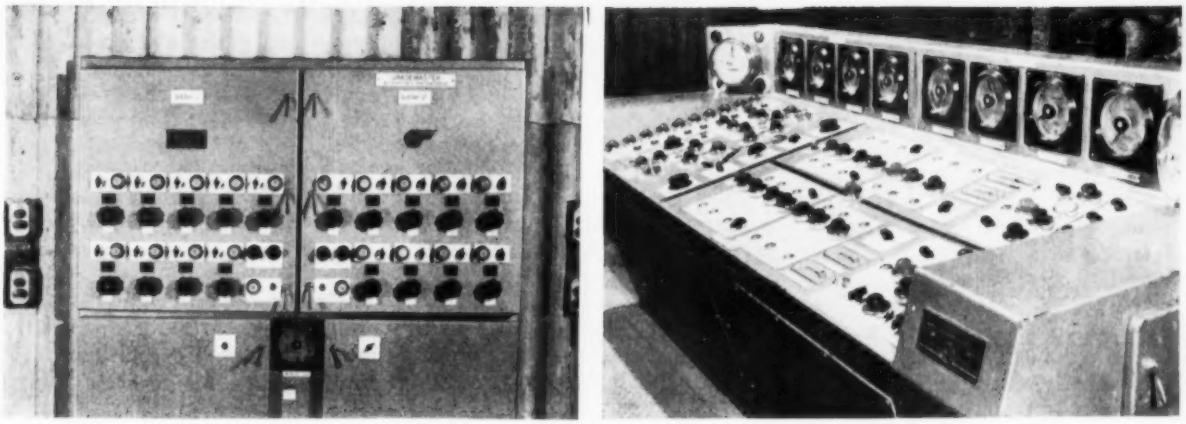
Slag is drawn off in batches, each with the correct proportion of each fraction delivered by the various proportioners, and the complete batch is delivered to the hoppers of the coating plant, where it is automatically check-weighed. Delivery of the batches is controlled from the coating plant, and is described further on.

Above: The unusual loading boom conveyor is pivoted at the shore (right) end and on curved rails at the loading end, so that ships need not be moved.

Below: This view shows the main screening building, with the aggregate-bituminizing (coating) plant at the right.

Loading Wharf The conveyor installation serving the wharf is of particular interest. It was designed to deposit and distribute material in the holds of a vessel along any part of its length without moving the vessel along the quayside as loading progresses. To make this possible, the loading installation is in the form of a bridge spanning 98 ft. which is arranged to pivot about the end on which the conveyor receives the material. At its outer end this bridge is supported by a column structure carried on a curved track by two carriages in such a way that it can be moved through about 90 degrees. Within the bridge there is a separate wheel-mounted conveyor so guided that it can be telescoped by a rack-and-pinion gear to deposit the material it receives from the fixed conveyor through a chute into the hold of a vessel. Material can then be deposited into any hold along the length of a vessel (the conveyors cover a length of about 200 ft. measured at the center line of the vessel) without the delays occasioned by moving the vessel to bring its holds into the loading position in respect to a fixed chute.

A cabin at the delivery end of the pivoting conveyor is equipped with a central control panel from which the storage hopper feeders in the main storage house are started and stopped. The cabin gives a clear view of the loading operation, enabl-



The two sets of dual controls for the coating plant which make the entire processing flow automatic until it is changed. At the left are the two banks of proportioning controls. The main control desk at the right controls and records all other operations.

ing the operator to pivot the conveyor bridge, extend, or retract the telescopic conveyor, and lower or raise the telescopic delivery chute to the holds.

A remote rate indicator and totalizer indicate in the control cabin the measurements made by the weigher. The storage hopper feeders are started and stopped only from the cabin, and must first be selected from the main storage house; indicator lights in the cabin show which feeders have been selected.

The conveyor installation is carried on a reinforced concrete jetty projecting 110 ft. into the river. The jetty consists of a heavily reinforced concrete slab supported by steel piles driven into the marl underlying the site.

BITUMINIZING

The coating plant is positioned at right-angles to the line of the main plant, and so is shown as an inset in the accompanying elevation drawof the plant. It consists of two heating and mixing units, each of 60-cu. ft. capacity, set side by side. The batches of graded material are conveyed from storage to a bifurcated chute delivering into one or the other of the weigh hoppers of the two units which check-weigh the complete batches.

The sequence of operations is then as follows: The batch passes from the weigh hopper, through a Thrustor-operated door to the heating drum. After heating, an electrically-operated pivoting chute opens and transfers the batch to a double shaft paddle mixer. Here, binder and flux (if required) are added as sprays, in measured quantities; filler is also added for some mixes.

The batch may be discharged from the mixer (the discharge door being also electrically operated) directly into lorries or into one of three 20-ton capacity "mixed-material" hoppers. This set of hoppers is mounted like an overhead traveling crane. One such traveling unit serves each mixer and traverses the loading bays.

It should be pointed out that the filler added at this stage is not produced in the main plant, but is brought in to supplement the fines already available. It is delivered by lorry into a ground hopper, and transferred by a Redler elevator of 9 t.p.h. capacity, to a service hopper. The latter has a leg serving each of the two mixers, with a capacity of about 2 tons available for each. An electrically-controlled weigh hopper weighs the given quantity of filler, which is then discharged into the mixer through a helmet door.

Various other services must be provided at the coating plant. Binder is heated in electric heaters (three of 6,000-gal. and one of 4,000-gal. capacity) and flux is stored in two 1,000-gal. tanks. Automatic devices meter these materials before they enter the mixers. Four binders are catered for, permitting the production of material to any required specification.

An alternative mode of operation utilizes the plant for the production of water-bound macadam (or "wet mix," as it is now called), so that water also can be added and metered into the mixers. Oil fuel is stored in two 1,000-gal. tanks, and again its delivery is controlled according to the heating cycle. A compressor with a capacity of 48 cu. ft. of free air per minute powers all the pneumatic apparatus on the mixing units, including binder, flux, and water meters, and automatic pneumatically operated control doors. The operating pressure is 80 p.s.i.

Control It will be appreciated that automatic control of the coating plant is somewhat complex in design; however, it is simple in operation. The brief outline of its functions which we have just given indicates the various measurements —batching, weighing, metering, and temperature and time control— which must be effected for each batch, and which might well have to be varied from batch to batch. Further, the two mixers may be mixing simultaneously to differing specifications; therefore the whole train of events must be protected by electrical interlocks, so that the correct sequences are followed and yet maximum capacity is achieved by the two mixers.

This mixing plant will, in fact, produce a variety of coated mixtures at the rate of 150 t.p.h. under favorable conditions.

Batches follow each other through each mixer—one in the mixer, one in the heater, and one in the check-

weigh hopper. A train of seven batches (*i. e.*, the quantity to fill one mixed materials hopper) can be initiated entirely automatically by pressing a button; and then the whole cycle can be repeated by pressing it again. All controls are grouped on a control desk and a setting panel, one set of controls servicing each mixer unit. However, control may be automatic, semi-automatic, or by hand control for sectional operation or maintenance.

The two banks of setting controls govern the proportioning of the various fractions in a batch, and hence the control the proportioners at the main storage hoppers. In each bank a dial is incorporated for each fraction, and is set to show the percentage of that fraction delivered onto the belt. When a batching cycle is initiated, the total must be 100 percent before the cycle can be started. The main dials are graduated in 5 percent increments, with an adjustment for superimposing 2½ percent on any given reading.

The main control desk, also divided into two banks, incorporates —in addition to the control switches —dials on which the specified times of the operations in the mixing cycle are set, plus a batch counter and a batch totalizer in each bank. When a measured batch of materials has been placed on the conveyors, from the settings on the panel just described, the essential measurements and controls as the batch passes through the plant are as follows: check weighing in the weigh hopper; discharge to the heater; heating for a given time; discharge to the mixer; addition of a metered quantity of binder and flux (simultaneously if required, or separately, or one without the other) at a given time after the start of aggregate discharge into the mixer; weighing the filler; addition of the filler at a specified interval after the addition of the binder; mixing for a given time after addition of the filler; discharge to the lorry or to a hopper positioned by a selector switch.

Opening and closing of all doors is automatic and interlocked to ensure that the preceding batch is clear of the next stage. All meters reset automatically after discharging the metered quantity into the mix.

The oil consumption of the heater is recorded as a total and as rate of flow; the flame is reduced to a pilot flame when the heating period has been completed, and is restored when a new batch is introduced. A photo-electric device re-ignites the flame if it should be extinguished, or warns the operator if it fails.

In semi-automatic operation, the proportioner panel pushbutton is pressed to bring a batch to the selected weigh hopper. The weigh hopper door button is then pressed to initiate the automatic passage of the batch through the heating-and-mixing unit for ultimate discharge from the mixer. In hand operation, individual pushbuttons are pressed to initiate batches from the graders to the weigh hopper, to discharge from the weigh hopper to the heater drum, to discharge from the heater drum to the mixer, to add binder and flux, to add filler, and to discharge from the mixer. The filler hopper automatically recharges while all doors and chutes automatically return to the closed or "out" positions.

Control and selection of the travelling hoppers and the direct discharge chute in the loading bays is made at the desk, and a warning light indicates to the man at the loading station that the travelling hoppers are about to move. Pneumatically-operated doors on the hoppers have electric heaters and are under the pushbutton control of the man at the loading station.

Dust Suppression In conclusion, two or three general points about the Teesport plant may be remarked upon. Various devices such as the proportioners, binder meters, and automatic doors have not been described in detail, for although they are somewhat sophisticated mechanically, they are generally of standard Stothert & Pitt design for a plant of this kind; and we have concentrated upon the general conception, which has more novelty. The emphasis is upon accuracy, automatic control, and labor saving, with increased output.

No mention has been made so far of the attention given the dust suppression. There is little evidence of dust when the plant is in operation. In the main section of the plant, water sprays have been installed at various points to keep the moisture content of the slag high enough to lay the dust. A wetting agent is added to the water. The sprays are at both ends of the first conveyor (*i. e.*, at the ground hopper and the mill house), at the tail of both conveyors between the mill house and the selector screens, and at the tail of the conveyor between the selector screening unit and the main storage house. In the coating plant, extractor fans serve the building and discharge through filters where the dust is recovered.

Miscellaneous Another important element in the plant is a laboratory, where routine tests of roadstone products are carried out. Other facilities include a fitting and maintenance shop, a sub-station, and rest rooms.

Acknowledgments We wish to thank Tarmac Roadstone Ltd. personnel for their collaboration; the editor of the British journal, *The Engineer*, for permission to use some of the material from an article on Teesport originally published in that journal; and S. H. Wright & Co. Ltd. for permission to reproduce some of the photographs of the Teesport plant.

Portland Cement Association Praised for Safety Progress

An award for a well-balanced safety program and a better-than-average progress in accident prevention was presented to the Portland Cement Association at the annual convention of the National Safety Council held in Chicago.

Fourteen associations received similar awards. They are presented for outstanding safety activities—publicity, safety contests, safety materials, and co-operation with other agencies. The 1958 contest winners represent more than 82,609 firms employing more than 2,000,000.

Utah State University will study ways of making better soil-cement in areas where there is considerable sulphate in the soil under a grant from the Portland Cement Association. Scientists from the university, under the direction of Professor William Cordon, will seek methods of combating sulphate damage.

Part I

Wet Grinding of Cement Raw Materials

By J. RICHARD TONRY

Synopsis

WET raw grinding with the operation of circuits using classifiers is discussed. Various classifiers are being used in the cement industry to increase the production rate of grinding equipment and to eliminate oversize particles from slurry.

Summary

A study of existing installations using partial or complete closed-circuit grinding shows:

1. Vibrating screens may be used to better advantage through use of stainless steel cloth and larger circulating loads. Screencloth with openings as fine as 65-mesh is being used successfully.

2. Installations using rake-and-bowl classifiers with thickeners are operating with satisfactory water content in the slurry produced, and the fundamental operating practices have been collected. Chemical flocculating agents may be used to assist settling of fine solids. Thickeners hold large amounts of slurry (225-ft. diameter — 15,000 bbl.) and aid in obtaining uniformity of kiln feed.

3. Liquid cyclones have entered the cement industry from the mining and metallurgical fields. The moisture content desired in the slurry for kiln feed has made necessary the development of operating information particularly suited for this use. This classifier appears to have an interesting potential for closed-circuit raw grinding.

Introduction

In wet raw grinding the need for increased production and more favorable particle sizes led to the use of various grinding systems. These included compartment mills, scalping screens, two- or three-stage open-circuit mills and the use of combinations including classifiers, both in closed circuits and partial closed circuits.

In the grinding of raw mix by open-circuit methods, maximum power is required, and coarse particles in objectionable quantities may be present. For many years the standard for fineness was 90 percent or higher, passing the 200 sieve, which was understandable from the standpoint of holding these over-size particles to the minimum. At times, excessive amounts of coarse particles introduce severe obstacles to proper burning of a raw mix in the kiln, caused by the longer reaction time of a coarse particle of lime or silica as compared to the average sizes in the raw mix.

The economic advantage of closed-circuit operation is indicated in statistics obtained at a plant where various types of grinding were tried, using the same raw materials. Both higher production rates and lower power consumption were obtained with closed-circuit grinding, than with open-circuit grinding, as shown in Table 1. Other factors also influence the selection of a grinding circuit, such as slurry fineness, slurry viscosity, water content of the finished slurry, maintenance expense, and dependability of equipment.

These figures are shown for comparative purposes only in one plant, as differences in raw materials and equipment make similar comparisons between plants rather difficult. Each one of these classifiers is discussed at some length later in the report.

Table 1—Comparison Of Open- and Closed-Circuit Raw Grinding

System	Production T.P.H.	Power Kw.-H. /Ton
Open circuit	18	20.6
Closed circuit		
Bowl classifier	30	14.0
Mechanical cyclone ...	33	13.1
Liquid cyclone— low moisture	27	14.3
Liquid cyclone— high moisture	33	12.2

Grinding systems based on partial or complete closed circuits incorporate one or more of the following classifiers:

1. *Vibrating Screens*—Two types of screens are generally used, mechanically vibrated or electrically vibrated.

2. *Rake-and-bowl classifiers*—These may be used in either single- or two-stage systems. In the single-stage system, a rake and bowl operate in closed circuit with a grinding mill. The two-stage system uses a rake in closed circuit with a grinding mill, followed by another closed circuit using a rake and bowl. A thickener is required to reduce the slurry water to a desired level.

3. *Liquid cyclones*—The use of liquid cyclones is a recent development in the cement industry. They are common in some other industries where the classified product comes from the underflow, or with excess water in the overflow. In the cement industry the classified product comes from the overflow, which carries the most water, and thus applications to slurry must be developed. In handling slurry, the liquid cyclone is subject to rapid wear, but this shortcoming is being overcome by experimentation with various construction materials.

Fineness of Slurry

Plant standards for slurry fineness vary from 78 to 95 percent passing a 200-mesh sieve. Table 2 shows

the finenesses used by the plants included in this project. Even where apparently the same raw materials are being used, a difference in No. 200 may be seen. For example, one plant using marl and clay grinds to 78 or higher, passing the 200-mesh sieve, may be contrasted with a plant using similar raw materials, but holding to 88 or higher passing the 200-mesh screen.

Also shown in Table 2 are some surface area and percent passing No. 200 data on grinding from three other plants. Two closed-circuit operations show No. 200 fineness of 87.1 and 87.5 percent and surface areas of 3952 and 3557 cm.²/gm., respectively. This contrasts with results from an open-circuit scalping type of operation with a No. 200 of only 83.9 and surface area as high as 4044 cm.²/gm. If ground to the mesh fineness of the closed-circuit slurry, this would show a much higher surface area. Typical of this situation are results from another plant, as follows:

Two-stage open circuit—6,000 cm.²/gm. Compartment mill, open circuit—5,300 cm.²/gm.

Surface areas of raw mix are obtained by use of the Wagner turbidimeter.

The fineness standards maintained in the various plants are determined to a large extent by the nature of coarse constituents. The use of relatively pure materials such as silica sand, high-calcium limestone, etc., as compared to less pure materials, accounts for the differences. Investigators* have found that 0.5 percent coarser than about a No. 70 screen may be tolerated if the material is siliceous. If the coarse particles are relatively pure calcite, 5.0 percent coarser than about a No. 100 can be tolerated. Also, a certain amount of fine particles is needed, about 35 percent below 15 microns, in order to obtain a reasonable burnability.

Table 2—Plant Fineness Standards

Percent Passing No. 200	Raw Materials
78 or more	Clay, marl
79 to 81	Shale, sandstone, limestone
85	Clay, limestone
85 to 86	Shale, sand, iron ore, limestone
86 to 89	Clay, sand, limestone
86.5	Cement rock
88	Clay, marl
88 to 91	Shale, sand, iron ore, limestone
95 to 96	Shells, sand

Actual Plant Samples

Percent Passing No. 200	Surface Area cm.²/gm.	Grinding Method
87.1	3952	Closed-circuit, single-stage rake and bowl with thickener
87.5	3557	Closed-circuit, single-stage cyclone with thickener
83.9	4044	Open-circuit, single-stage, with scalping

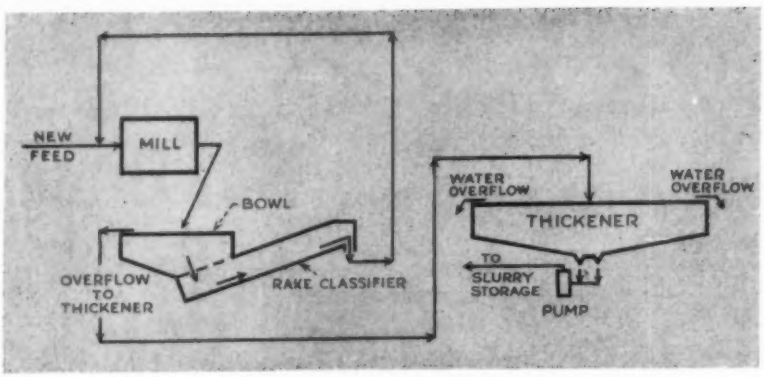


Fig. 1—Single-stage closed-circuit grinding into thickener.

Classifier Application

Three general types of classifiers have found applications in wet raw grinding in the cement industry and important characteristics of each have been accumulated. The information has been divided into three parts as follows:

I — Vibrating Screens in Raw Grinding

II — Rake-and-Bowl Classifiers

III— Liquid Cyclones

I—Vibrating Screens in Raw Grinding

Vibrating screens are used in two-stage systems for raw grinding, where the preliminary mill is in closed circuit and the secondary mill is in open circuit. Single-stage grinding systems use screens for scalping the oversize rather than acting as true classifiers.

In the two-stage system the grinding capacity of the secondary mill determines the size of opening which can be tolerated in the screen and imposes a definite limitation on production rate. Since this mill is charged for fine grinding, oversize particles are not reduced and may introduce a coarse fraction into the kiln feed. Some optimum point must be established between fineness necessary for satisfactory operation and production rate through the grinding system.

If the screen serves as a scalper, the slurry fineness is improved by the use of the smallest permissible openings in the screencloth. In going to smaller sized openings, larger screening areas are required, and therefore the limiting factor to production is the largest particle size which can be tolerated in the raw mix.

Table 3 shows the plants using screens in raw grinding as well as raw materials, grinding mills, and general arrangement. Plants 4, 9, and 13 are two-stage systems with the preliminary mill in closed circuit. Plant 7 uses two-stage grinding, but the first stage is more complex, incorporating a wash mill, sizing screens, a screw classifier, and classifying screens. This system processes a mixture of clay and marl.

Table 4 shows the vibrating screens being used and pertinent information. Slot-type openings are being generally used and vary from 0.075 to 0.104-in. for two-stage systems. For scalping, a 0.11-in. opening is used. Stainless steel cloth is being used in most of these plants, because of its longer life. Steel cloth appears to last for 3 to 6 weeks, and stainless cloth about six times as long, or better.

Table 5 lists reported power figures for raw grinding. A distinction is made between mill power for auxiliaries. In three plants the aux-

The Influence of the Fineness of Cement Raw Mixes on Their Burnability—T. Heilman

iliaries used 6.0, 7.4 and 7.9 percent of the total power. One plant uses 25.4 percent of the total power for auxiliaries, but this includes a wash mill of rather large proportions for washing, disintegration, and separation.

Table 6 shows the fineness of the raw slurry and moisture content. The plant (6) showing the lowest moisture uses a slurry thinner.

Table 7 iists information on two grinding mills of the compartment type, using a screen for scalping. These are large mills, included at this point for comparative purposes.

Table 3—Grinding Systems Using Vibrating Screens

Plant	Raw Materials	Grinding Units	Classifier
4	Limestone Shale Sandstone	Ball mill Tube mills	Vibrating screen with ball mill in first stage
7	Marl Clay	Wash mill Ball mill Tube mill	Screw and vibrating screens in first stage with ball mill
9	Limestone Shale Sand Iron ore	Ball mill Tube mill	Vibrating screen with ball mill in first stage
13	Limestone Shale Pyrite sinter	Ball mill Tube mill	Vibrating screen with ball mill in first stage
6	Limestone Shale Sand Iron ore	Compartment mill	Vibrating screen (considered as scalping rather than sizing)

Table 4—Vibrating Screens Used With Preliminary Mills And One-Stage Systems

Plant	Size	Vibration	Opening	Wire Diameter	Total Screen Area*
4	4′x6′	Electrical	0.096″ slot	0.080	24 sq. ft.
6	4′x5′	Electrical	0.11″ rectangular	0.080	20 sq. ft.
7	4′x6′	Electrical	0.075″ rectangular	...	48 sq. ft.
9	4′x6′	Mechanical	0.104″ rectangular	Ex-heavy	48 sq. ft.
13	5′x6′	Mechanical	0.096″ rectangular	...	90 sq. ft.
15	5′x6′	Mechanical	0.008″ square	...	30 sq. ft.

*Total area is determined by surface of single screen times number of screens.

II—Rake-and-Bowl Classifier

This system has found limited application in the cement industry although it offers greater power advantage than other grinding systems. The reason has been that difficulty is often encountered in obtaining the proper moisture content in the thicker underflow. In plants using raw materials containing such minerals as bentonite there are serious problems in settling. In addition, operation of the two-stage system is often difficult. Table 8 shows the general characteristics of these systems. In recent years the development of new flocculating agents offers a possible solution to some settling problems.

The single-stage closed-circuit system is being successfully used, and information is included from one such installation.

The use of a recording ammeter in the thickener rake motor circuit is an aid to keeping the operation under control. By means of inspection of the chart and suitable alarm points, corrective measures can be taken when needed. Manufacturers of the radiation-type density control devices claim automatic regulation of underflow pumping rate can be successful.

Certain details in thickener operation are as follows:

1. A supply of thickened slurry must be accumulated at the bottom of the thickener. This may take three to seven days by the addition of new feed when starting from an empty condition.

Table 5—Total Power Used In Two-Stage Raw Grinding (Kw.-H./Ton)

Plant	Preliminary & Secondary	Auxiliaries	Total
4	10.3	0.82	11.12
7	14.5	4.93	19.43
9	17.6	1.50	19.10
13	20.2	1.28	21.48

2. When the thickener appears to have any load on the raking mechanism, the underflow pumps must be operated to remove thickened slurry, or to recirculate if it is too thin for use. The safest procedure is to withdraw at a low rate with frequent checks of the slurry moisture. The reason for withdrawing slurry is that an excess of overthickened slurry may clog the exit openings or overload the rakes.

3. After a thickener has reached a satisfactory operating condition, the rate of withdrawal should equal the addition of new feed. When slurry is withdrawn at a higher rate than it is being replaced at the bottom, the moisture in the underflow will go up.

4. For the best results, a thickener should never be allowed to stand idle. If new feed is not being added or slurry withdrawn, the underflow must be recirculated.

Single-Stage Closed-Circuit

Figure 1 shows a diagram for a typical single-stage rake-and-bowl

Table 6—Finished Product Fineness and Moisture (Grinding Mills with Screens)

Plant	Percent Passing				Percent Water
	No. 50	No. 100	No. 200	No. 325	
4	99.8	89.7	80.1	69.2	38
7	97.5	91.5	81.3	69.3	40-50
9	99.6	97.5	89.9	...	38
13	99.6	97.2	90.8	...	37.5
6	99.6	95.6	83.9	...	33
15	99.9	...	87.0	...	36.5

Table 7—Grinding Mills With Scalping Screens (Compartment Type)

Plant	Mill Size	H.P.	Speed (R.P.M.)	Grids	Liners	T.P.H.	Ball Charge Weight (Tons)	Ball Charge Volume (Percent)	Ball Size Makeup	Ball Wear Lb. per Ton
6	8′x40′	1000	19.9	⅝″x11/16″	Spiral	38	98.5	40	4″-2″-1¼″	0.8
15	10′x35′	1500	18.1	⅜″x7/16″	Lorain	69	143.5	40	.....	..

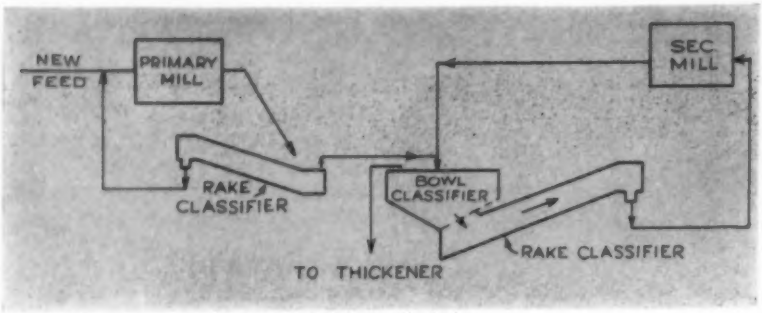


Fig. 2—Two-stage closed-circuit grinding with thickener.

Table 8—Closed-Circuit Systems Using Thickeners

Plant	Raw Materials	Grinding	Classifier
1	Clay (wind blown deposit); limestone—hard, except for one ledge 1½ ft. thick out of 39 ft.	Single compartment tube mill for clay slip and limestone; clay slip added to mill discharge. Wash mill for clay.	Single-stage rake and bowl to thickener
2	Cement rock	Ball mills	Two-stage rake and bowl to thickener
3	Limestone Clay Sand	Compartment mill	Centriclone to thickener
8	Shells Sand	Ball mill	Rake and bowl single-stage to thickener

installation. The mill discharge enters the bowl classifier with extra water added at the mill and at the classifier; the fines separate and are floated over the edge of the bowl. Coarse material sinks to the bottom of the bowl and is raked to the discharge openings, then passing through a rising water stream down to the rake compartment. This is the point where a high concentration of solids can build up and consequently stop the bowl rakes. As a solution for this problem, one plant uses water jets at the back end of the rake compartment to prevent settling out.

Two-Stage Closed Circuit

The two-stage system of closed-circuit grinding is made up of a rake classifier in closed circuit with a ball mill, followed by another rake-and-bowl classifier in closed circuit with a second ball mill (Fig. 2). The first circuit does preliminary grinding, and the mill is charged with large balls. The rake overflow passes to the bowl classifier, where fine solids leave the system and coarse solids go to the second mill, which is charged for fine grinding. Harder portions of the raw material form a circulating load in the second mill, which is charged for fine grinding. Harder portions of the raw material form a circulating load in the second stage.

During operation, the two units must be co-ordinated to avoid overloading or low production. The operator generally watches the super-elevation (the water level) in the secondary system for signs of change. If the level comes up, the load is building in the classifiers, and conversely, the load may be decreasing. Also, the return load on the rakes is watched for changes.

Closed-Circuit Grinding Mills

Table 9 lists the important characteristics of grinding mills used for this type of system. The plants shown use the compartment mill, the tube mill, or the ball mill for grinding. Grid openings are different in each plant, ranging from ¼-in. for the tube mill to 1¼-in. for the preliminary ball mill. The most preferred type of opening is the tapered slot, smaller on the inside. This minimizes clogging of the holes, but causes the opening to get larger as wear takes place. In one plant, these inside slots peen over, and it becomes necessary to remove the metal and any balls which stick in the slots.

One plant (1) is securing very good performance from a converted compartment mill. Division heads were removed to make this mill into a single-compartment tube mill (7′X26′). A graded ball charge is used, and spiral liners help to distribute the larger balls throughout the charge. The mill has a low-level diaphragm type of discharge.

The ball mill used in plant 8 is equipped with wavy liners and has a ¼-in. rubber sheet lining against the shell. This rubber lining protects the shell from abrasion due to leakage through the liners and makes possible a close fit of the liners. It has lasted through the replacement of several sets of liners for a period of about 3½ years and is still intact.

Table 10 shows the ball charge

Table 9—Closed-Circuit Grinding Mills

Plant	Mill Size	HP.	Grid Openings	Liners	T.P.H.	Speed R.P.M.
1	7′x26′	500	¼″x⅜″	Spiral	70	21
2	9′6″x8′8″ Primary	350	1¼″x1½″	—	70	19
2	9′6″x8′8″ Secondary	350	⅜″x⅞″	—	—	18.5
3	8′x7′x26′	500	5/16″x3/16″	Lorain	34	20
8	10′x15′6″	700	⅜″x9/16″	Wavy	18	19.6

Table 10—Closed-Circuit Mills—Ball Charge

Plant	Ball Charge Weight—Tons	Ball Charge Volume—Percent	Ball Wear Lb. Per Ton
1	48	40	0.20
2	32 (Primary)	36	0.08
2	32 (Secondary)	36	0.37
3	50	45	0.42
8	54	35	1.7

in the mills by weight and volume. General practice in recharging is to add the largest size of balls for makeup and to use a graded charge when the mill is dumped. Balls too small for any compartment or mill are discarded or used in a suitable location.

Classifiers

Table 11 lists the important characteristics of classifiers used in this type of closed-circuit grinding system, using thickeners.

The coarse material is raked up the incline against a flow of water which removes most of the fines; the coarse goes to join new feed to the mill. Water sprays on the oversize near the middle of the rakes, and occasionally at a location nearer the discharge, in small amounts. This water serves to raise the level in the rake compartment to 5 or 6 in. above the bowl water level.

The fines overflowing the bowl classifier may be diluted to 80 to 90 percent water. The size of separation is determined by dilution; the more dilute the plup, the finer the solids.

Grinding

In Plant 1 two constant weight feeders are used for high and low $CaCO_3$ limestone going to the mill. For adjusting the holding point, about 10 percent clay is added at the mill discharge in the form of a slip containing 60 to 65 percent water. For a number of years, the limestone and clay were ground together, since it was felt that the intimate mixing of the two obtained in this manner was necessary.

By the present method of operation, only a fraction of the clay goes through the mill, as most of it overflows the classifier. The combined slurry from the mill, clay slip, and extra water flow to a sump near the mill end and are pumped up to feed the bowl classifier. Extra water is added to make the slurry easier to pump and to increase the water ahead of the classifier.

This mixture of clay slip, slurry from the mill, and water enters the center of the bowl and, with more added water, flows into the classifying area. Fines overflow with about 80 percent water, and oversize drops down through the bottom of the bowl to the rake compartment.

Table 11—Classifier Data

Plant	Classifier Size	Speed
1	Rake - 12′X18′	19 strokes per minute
	Bowl - 25′ diam.	57 sec. per revolution
2	Rake - 8′X25′6″	25.5 strokes per minute
2	Rake - 16′X40′6″	10.7 strokes per minute
	Bowl - 27′ diam.	67.2 seconds per revolution
3	Centriclone - 20″	983 r.p.m.
8	Rake - 12″X27′6″	14 strokes per minute
	Bowl - 20′ diam.	47 seconds per revolution

Table 12—Screen Tests

Closed Circuit with Rake and Bowl Classifiers
Mill Samples—March 6, 1956, Plant No. 1

(Percent Passing)

Size	New Feed	Mill Discharge	Rake Oversize	Bowl Overflow	Circ. Load	Clay
½″	99.04					
⅜″	98.07					
No. 4	79.49					
6	66.08	99.55	98.60			
8	54.88	...	97.70			
12	46.21	98.89	96.36			99.87
16	37.53	98.18	94.08	100.00	Percent	99.34
20	30.16	96.80	91.01	99.97	55	98.28
30	24.52	94.44	86.63	99.93	70	96.55
40	19.64	91.05	79.56	99.90	77	94.23
50	15.63	84.96	67.29	99.90	85	91.52
70	12.05	76.01	49.81	99.83	91	89.00
100	9.34	62.79	26.38	98.59	98	89.00
140	6.85	49.67	9.21	90.13	100	86.41
200	4.46	45.04	5.64	84.50	100	85.88
% Water	...	25.1	27.0	77.0	Ave. 85% ...	49.7

The solids are raked up the incline, and more water is added near the middle of the rakes. Any fines trapped in the oversize wash out in the rakes and flow up into the bowl. The superelevation between the bowl-and-rake compartments is about 5½ in. (6 in. in Plant 8). For results of screen tests from the complete circuit see Table 12.

The amount of water in the bowl overflow determines the fineness of the solids. More water results in an increased fineness. There is no adjustment on the bowl or rake speeds, and it is essential that the leveling strip around the bowl be kept level to get a uniform flow.

Water is added to the system by manual control, based on inspection of the mill discharge by the mill operator. The slurry is kept rather thick coming from the mill in order to get better grinding, generally in the range of 25 to 30 percent water.

Control tests of the mix going to the thickeners are done on samples collected by an automatic sampler. They are based on an acid-alkali test, and correction is made by adjusting the limestone or clay feed to the system.

Marquette Subsidiary Headed By Morris, Succeeding Lane

According to an announcement released by J. O. Lane, sales manager for Southern States Portland Cement Company, Atlanta, Ga., this concern was absorbed on January 1 by its parent organization, Marquette Cement Mfg. Co.

Mr. Lane also announced his retirement from active service with Southern States, and the appointment of John A. Morris to succeed him in the post of sales manager in the Atlanta area.

Southern States Portland Cement, founded in 1902, became a sales subsidiary of Marquette in 1954, when the company and its plant at Rockmart, Ga., was purchased by Marquette.

Regular quarterly cash dividends of $1.25 per share on preferred shares and 25c per share on the common were declared by the directors of American-Marietta Company. Sales, which increased again for the ninth consecutive year, are estimated to have been in excess of $250,000,000 for the 1958 fiscal year ended November 30.

here are some cogent reasons why you should Budget Your

By HAROLD J. ASHE

TALK to an unsuccessful manufacturer, and the chances are his expressed cause for failure will be summed up with the excuse, "Insufficient business." Discuss his plight a little further, lending a sympathetic ear, and its likely he will express his management philosophy somewhat in this vein: "Get the business, and the expenses will take care of themselves."

Yet, expenses can be as worrisome to a manufacturer with a large volume as for his smaller counterpart who has to scratch for business. Business expenses at any level of volume must be controlled. These outlays must be anticipated and be prepared for, according to a plan. Too often a manufacturer does not know, even within a wide margin, what his expenses *should be* or *will be* within a given accounting period. He knows what his expenses are only after they have been incurred—not before. Under such circumstances his expenses are not being controlled.

This problem of expenses can be particularly important to a manufacturer who experiences substantial fluctuations in volume—seasonal or otherwise. Between mounting expenses and declining gross receipts, a manufacturer may be caught up in a net of circumstances from which only failure offers a dubious release. Fixed expenses, he may discover belatedly, are just that. When he fails to control his business expenses, the expenses control him.

Why Budget?

A budget can be an indispensable tool for those manufacturers who are mindful that runaway expenses can rob them of the earnings to which they are entitled. An expense budget can assist those manufacturers who suspect that certain costs are too high, but who cannot confirm their fears by other means. A budget of expenses, carefully drawn and faithfully observed, can accomplish the following things:

- Bring each item of expense into relation with total expense and expose those which are excessive in cost in respect to their business importance.
- Reduce wasteful outlays.
- Restrain management from assuming new expenses which cannot be justified.
- Flash a timely warning when expenses get out of line.
- Establish a relationship between receipts and expenses which, after a sufficient period of time, can be used as a guide for the future.
- Expose weak spots needing more management attention.

A workable expense budget can't be pulled out of a hat nor achieved by wishful thinking. It must reflect the hard realities of a particular manufacturing business and its competitive circumstances. It must be detailed; otherwise, some items needing close control may be lost from view, being lumped in with other expense items.

Although various expense items are separately identified, these should be related to or be bracketed with others when circumstances warrant. For example, if a manufacturer owns his plant buildings, the occupancy cost may be larger than he realizes. This cost will include property taxes, maintenance, and interest on the mortgage, if any, as well as depreciation charges. He may also find it enlightening to charge a fair interest rate on his building equity or outright ownership of the property. (This last, of course, is not a business expense for income tax reporting purposes because, as it comes out of one pocket as expense, it goes back into another pocket as income. It is important, however, to get a proper perspective on occupancy costs.)

In preparing a first-time realistic expense budget, a manufacturer must go to his records to determine what his costs have been in practice, and how these have been distributed. On careful analysis, he may find that overall expenses are not excessive but that some outlays are, nevertheless, out of line. He may discover that he has been holding down on promotional or other business-creating outlays, while spending too much for fringe items of dubious real value. Some of the latter may be eliminated entirely, either to fatten net earnings or to make such funds available for productive purposes.

Manufacturers often tolerate certain unjustified expenses because each individual outlay or category is small in dollars. This is the dollar-here-ten-dollars-there type of expenditure incurred without too much reflection. However, these frequently recurring outlays, involving many small items, may amount to a considerable sum in a year. They can sharply reduce net earnings.

Stay With the Budget

An expense budget is futile unless it is adhered to within certain compelling modifying limits. In fact, it must be a management guide and control. Departure from a soundly conceived expense budget should be made only for the most compelling reasons, and then only after careful analysis. A manufacturer should never violate his budget capriciously. It should be used to fortify his resistance to outside pressures.

Expenses!

One compelling reason which will justify amending an expense budget is a sharp rise or decline in volume of business on which the budget is predicated. Obviously, material and wage costs will rise, dollar-wise, when production rises; conversely, they will decline with a drop in production. However, if volume rises substantially, only some items in the expense budget may need to be adjusted upward. Likewise, if volume declines, only certain variable items may be reduced. So-called fixed expenses are not quickly responsive to volume fluctuations.

To get the most management assistance out of an expense budget, it must be compared periodically with accounting reports for the like period covered by the budget. The actual expenses incurred will indicate how faithfully the budget was used as a guide and a control. Thus, the one is designed as a check upon the other. If actual expenses do not closely reflect the expenses forecast in the budget, one (or more) of the following may be true:

The budget is not being observed carefully.

The budget was not properly drawn in the light of the manufacturer's known expenses and past experience.

Rising or declining volume of business has distorted expenses.

If the budget appears sound and expenses have not closely followed amounts anticipated, a manufacturer should examine the facts carefully to learn how and why deviations occurred. Corrective measures should be taken quickly as needed. One of the fundamental purposes of an expense budget is to stop promptly any unjustified outlays which, otherwise, may run on indefinitely and impair net earnings.

Watch Percentages

Both in drawing up an expense budget and in analyzing it against expenses actually incurred, it is helpful to reduce budgeted items to percentage figures. Thus, occupancy cost may not only be expressed in dollars but as a percentage of gross receipts, estimated and actual. If gross receipts decline, the percentage must rise for occupancy cost. Likewise, when production and gross receipts mount, occupancy cost, percentage-wise, declines.

Percentage figures can be most illuminating in comparative studies of current accounting periods and past periods, such as the previous month and the same month the year before, or the first quarter of the current year with the first quarter of the previous year. As time goes by, expense budgets may more and more closely predict the actual expenses incurred for subsequent periods. This is because invaluable historical data has been accumulated as a point of reference.

It is well to keep in mind that when any item of expense increases one percentage point of gross receipts, or all items in the aggregate so increase, this additional expense must come off net earnings in its entirety. Watching these percentages in the expense budget, and their fluctuations from period to period in accounting records, is a basic step in guarding net earnings, both those hoped for and those finally realized.

An expense budget for an established business may cover a year's time. This yearly setup is then broken down into monthly and quarterly budgets. A new business, or one rapidly growing, may require periodic revisions upward because of special circumstances. The owner of a newly established manufacturing business has no past experience to use as a guide. Nevertheless, he may work out monthly budgets, month by month, during the first year. His actual monthly expenses may not too closely approximate estimates; but he is trying to establish controls.

In preparing budgets for periods of time shorter than a year, it is important that these reflect all expenses anticipated during the year. This is because some substantial expense items occur at infrequent intervals, not always within short-term budget periods. Some expense items may be incurred only once or twice a year.

In this category are property taxes, insurance premiums, licenses, building maintenance and repairs, employee bonuses or Christmas gifts, and association dues. These expense items are too often not reflected in short-range expense budgets. These may also explain year-end disappointment in net earnings. Failing to take such expense items into account, a manufacturer may prepare a more liberal monthly expense budget than otherwise, and may tolerate more parasitical items.

In this connection, monthly budgets will be more accurate if they include as a monthly expense a *pro rata* share of these infrequently recurring items. Thus, if a property tax is $840, it may appear in each successive monthly expense budget as $70. If, on the other hand, the entire expense for taxes appears only in the month's budget in which it is to be paid, an explanatory footnote should indicate this fact.

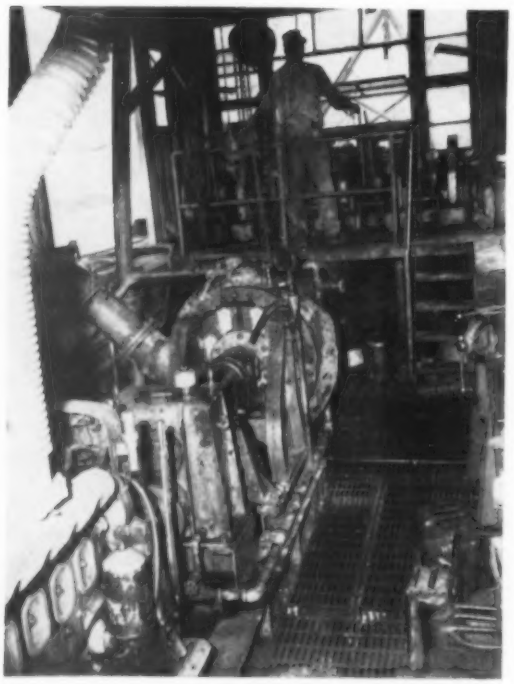
The 10-in. hydraulic dredge working at the bank at Sayre & Fisher Sand Company's operation near Sayreville, N. J.

Silica Sand

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

AN interesting example of diversification in the nonmetallic mineral industries is presented by the Sayre & Fisher Sand Company, which operates a new industrial sand plant in Sayreville, N. J. This concern is a division of the Sayre & Fisher Company, which has been producing clay brick at Sayreville since 1850. Once the largest brick manufacturer in the world, Sayre & Fisher is still one of the leaders in that field. In recent years commercial clay, silica sand, and lightweight clay aggregates (Aglite) plants were added at this location. Aglite plants are also designed and built by the firm for others. This organization also owns the Keystone Refractories Company, which makes refractory cements.



A view of the interior of the dredge, showing the diesel engine, the 10-in. dredge pump, and the operator at the controls.

Sayre & Fisher went into the sand business in 1953, using a good deposit overlying some of the clay it uses in its other plants. For many years the company had been working clay deposits where there was no sand, stripping overburden where necessary, but these had run out. Most of the 1,400-acre property which has not yet been worked is covered with sand deposits ranging from fine sand suitable for industrial purposes to coarser sand-and-gravel deposits.

The original plant was fed by a dragline and had a capacity of 25 t.p.h. A crew of seven men was required to operate it. The new plant, which went into operation in the fall of 1956, has a capacity of 125 t.p.h. and requires only six men for all operations, including one on the dredge. The plant was designed by the Western-Knapp Engineering Company.

The deposit now being worked covers 256 acres and averages 35 ft. deep above the clay. It is a white silica sand with approximately 98.7

Overburden on Clay Deposit

processed for industrial uses by manufacturer of clay brick, lightweight aggregates

percent silica and less than 0.12 percent iron before washing. Because of the high water level—11 ft. over the surface of the clay—dredging is done in a spring-fed pond. Recovery is by means of an Ellicott Machinery Company suction dredge with an 18- by 40-ft. compartmented steel hull 4 ft. deep. The *Sarah* has two spuds at the back end for walking and two side cables at the other end to help hold the dredge in position. The bank, up to 25 ft. above water level, usually caves, but a fire nozzle jet is used when necessary. The 30-ft. dredging ladder has a rotary cutter head to further insure steady feed.

The Ellicott hydraulic dredge pump (10-in. suction and 8-in. discharge) is driven by a GMC 671 diesel engine. Discharge to the plant is through a pipeline supported on steel barrel pontoons. This line consists of 8-in. Naylor spiral-welded pipe with Naylor wedge-lock, one-piece, quick-action couplings. The pipeline is about 600 ft. long and has a 35-ft. lift. Feed to the plant averages 125 t.p.h., with 10 to 15 percent solids.

The dredge line discharges upward into a breaker box lined with special steel, and the material and water drop onto a 5- by 16-ft. Hewitt-Robins Elliptex 2-deck screen. Half of the top deck has ¾-in. and half 1-in. wirecloth, and the bottom deck has ¼- and 3/16-in. cloth—all Newark. At present the plus ¾-in. gravel over the top deck and the ¼- to 1-in. over the bottom deck are carried on a belt conveyor to a waste pile. This waste forms from 2 to 5 percent of the total materials, depending on the varying gradation of the deposit.

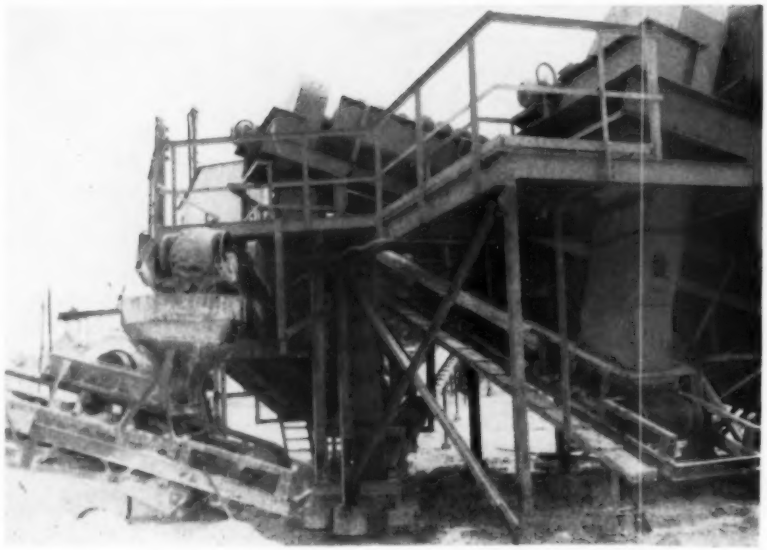
Minus ¼-in. material through the bottom deck goes to the No. 1 classifier, a 48-in. by 26-ft. 3-in. Wemco SH single-screw unit. This classifier has triple pitch (3½-in. per ft.), a modified flare tank, and a motorized hydraulic lifting device. It makes mason or concrete sand, as desired, by varying the rate of water flow; the product is stockpiled by a 24-in. conveyor.

Overflow from the No. 1 classifier is split to a pair of 72-in. by 45-ft. Wemco SH single-screw classifiers. These units have double pitch (3½-in. per ft.), full flare tanks, and hydraulic motorized lifting devices. Overflow from these is also controlled, so that some goes

This side view of the plant shows the arrangement of the screen over the three screw classifiers.

Left: Another view of the plant, seen from the main storage conveyor.

Below: The arrangement of chutes and conveyors under the screw classifiers permits separate storage of any screw product or blend.



in with the concrete sand to provide the necessary fines. The products of both classifiers can be discharged separately or in desired proportions to make different products, which can go to any of three different 24-in. stockpiling conveyors or to the main stockpiling system.

This system consists of a 24-in. by 80-ft. self-powered radial stockpiling conveyor, which is mounted on rails to swing in a 190-deg. arc. By means of pushbutton control this conveyor can be moved into position quickly to build several stockpiles for different products, totaling 12,000 tons capacity, or it can discharge direct to two 45-ton hoppers for truck loading. The other conveyors can also discharge to several piles by means of trippers.

Most of the overflow from the two large classifiers usually goes to a worked-out pond. Settled fine material is dug out with a crane when needed to blend in with other products. A Nelson loader feeds it through a hopper onto one of the stockpiling conveyors.

Products now being made are primarily concrete and mason sands. Sand for golf course traps, swimming pools, and play boxes are also made, and some is sold for use in the manufacture of Transite pipe and other products. The company plans to go into the manufacture of glass sand and is conducting tests to determine the equipment needed. A commercial sand and gravel plant is also planned for another area of the property. Frank Lapa is manager of the sand division.

Thor Becken Named President Of North Central Producers

Thor Becken, Cemstone Products Company, St. Paul, Minn., has been elected president of the North Central Commercial Aggregate and Ready Mixed Concrete Producers Association for 1959.

Other officers include the following: Oscar E. Anderson, Anderson Aggregates, Osseo, S. D., first vice-president; R. A. Everist, L. G. Everist, Incorporated, Sioux Falls, S. D., second vice-president; and Robert Shiely, Guaranteed Concrete Company, St. Paul, secretary-treasurer.

Mississippi Valley P. Cement Opens New Plant at Vicksburg

Production has begun at the new $5,000,000 plant of the Mississippi Valley Portland Cement Company, near Vicksburg, Tenn. Ultimately, the plant will produce 2,000 bbl. a day.

Cement will be shipped by bag and in bulk for the present, but eventually will be moved by barge from the Yazoo River to the Mississippi River.

W. L. RAPP of the North American Cement Corporation, has been promoted to chief engineer. He formerly held the post of assistant chief engineer. He succeeds JESS TINDALL, who has been transferred to Designers Metals Corporation, Chicago, as general operating manager.

Diesels work nine to twelve hours daily, get three years between overhauls

Courtney & Plummer does it with Cities Service C-300 Motor Oil.

With four crushing plants, sixty dump trucks, and a host of shovels, cranes, and miscellaneous equipment, Courtney & Plummer still finds it necessary to work nine to twelve hours a day, 5½ days a week to meet its tremendous production schedule.

Clearly, this schedule would be impossible if interrupted by frequent overhauls—but overhauls are few and far between at Courtney & Plummer. In fact, using Cities Service C-300 Motor Oil, diesels are getting three years before overhaul and dump trucks are running as high as 150,000 miles, with long periods of idling.

Even more significant, Courtney & Plummer has discovered it can use Cities Service C-300 Motor Oil in the engines of *all* its various types of diesel and gasolene powered equipment . . . with no need to stock several oils.

If you'd like to simplify *your* motor oil inventory and extend periods between overhaul, too, get the facts about versatile Cities Service C-300 Motor Oil. Talk with a Cities Service Lubrication Specialist, or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

80,000 to 150,000 Miles Between Overhauls is record rolled up by Courtney & Plummer's 60 dump trucks aided by Cities Service C-300 Motor Oil. And mileage tells only half the story, since trucks spend many hours idling as well.

A Million Tons of crushed stone and aggregate a year are produced by Courtney & Plummer, with equipment often in service 12 hours a day to meet the tight schedule. The firm has three portable crushers and one stationary plant.

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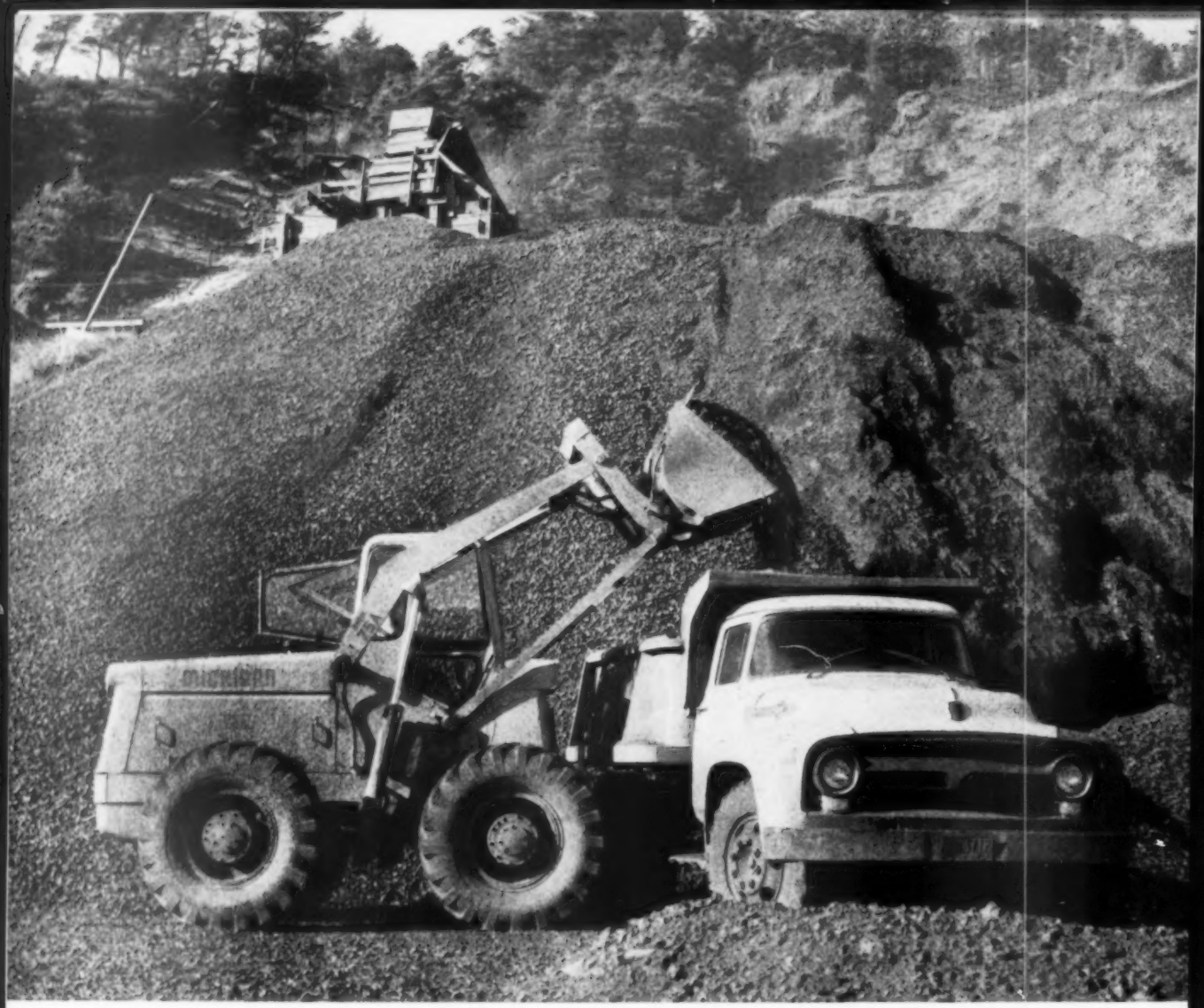


In 3 years, 1¼ yd Michigan loads 300,000 yds of rock. Yet...

REPAIR COSTS TOTAL $18.45

In studying most efficiency reports, you have to remember one extremely important fact: that the data given usually cannot legitimately be applied to machines now available. Changes galore—for good or bad—have been made since the veteran unit was built. That is why this report seems to us so significant. The Michigan Tractor Shovel described is in every important component EXACTLY like the Michigans made today. In fact, all 8,000 Michigan Tractor Shovels built have been like the first one—a tribute to the efficiency of design and efficiency of their all-Clark designed and built power trains.

For the past three years, Yaquina Head Quarries, Newport, Oregon, has used this Model 75A Michigan Tractor Shovel 6 to 8 hours a day, 5 days a week, truck-loading crushed rock. The machine has handled over 300,000 yards of material, ranging in size from ¼" to 4" minus.

Its only downtime in all these months has been for changing points and plugs, and for replacing two emergency brake cables.

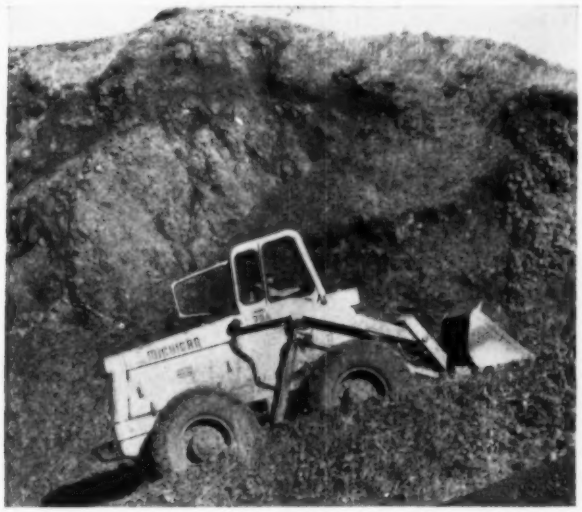
The work took less than 30 minutes and parts cost exactly $18.45.

For this superb record, credit belongs partially to excellent machine design and construction . . . partially to Plant Supt Virgil Landess' insistence on a simple, regular, preventive maintenance program. The Michigan is greased every day. Rear end and torque converter are checked twice a week. Oil is changed every 40 hours, filters every 80 hours, and a one-hour maintenance check made every two weeks.

"Cheap insurance for keeping an excellent machine excellent," says Quarry Owner Roy Sawyer.

Stock-piles at the Yaquina Head quarry are located in a quarter-mile semi-circle around the crusher, on two levels. Good brakes, excellent visibility, 26 mph speed, fingertip power steering combine to cut travel time between loading locations.

Material—after shooting, secondary shooting, crushing, and normal 2½-to-1 swell—weighs 2600 to 2800 lbs per yd. Mostly basalt, tests show a very small percentage of iron in the rock. Assays have picked up gold, too—80c worth per ton.



Steep 20% grade between stockpile levels proves no problem for the powerful four-wheel-drive Michigan—even in wet weather.

Among the many odd jobs done by Yaquina Head's quarries mobile Michigan Tractor Shovel: moving a 4,000 lb crusher head.

Loads typical truck in one minute

The 80 hp Michigan speeds all kinds of scattered assignments. It lifts crusher heads, for example. Picks timbers. Sets motors. But mostly it loads trucks. "Everything from pickups to 15 yard semis with 8 ft high sides," describes Owner Sawyer. A typical 5 yard truck is loaded in four bucket-fulls. Time: 1 to 1½ minutes.

Reduces truck waiting time 80%

Fast loading—plus fast travel between the nine stone stockpiles—has cut truck waiting time to practically zero. "In the old days—when we handled loading with a ¾ yard rubber-tired machine of another make—trucks often had to wait 10 to 15 minutes each for loading service," remembers Mr. Sawyer. "That old machine couldn't load out more than 250 yards a day. Our Michigan easily loads 400 to 500 yards a day. And it *has* loaded as much as 835 yards (in 8 hours)."

Eight models now available

How do your production requirements compare? If they're the same (or less), your most economical bet for the job probably would be a Michigan 1¼ yard all-wheel-drive model (like the machine described here). For greater output, you have a wide choice of bigger machines: with 2, 2¼, *and the new 4 or 6 yard buckets* (standard SAE measure). For clean-up around crushers and belts, there's a 16 cubic *foot* size. Eight standard models in all. See your Michigan Distributor for details.

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Patents Issued And Pending

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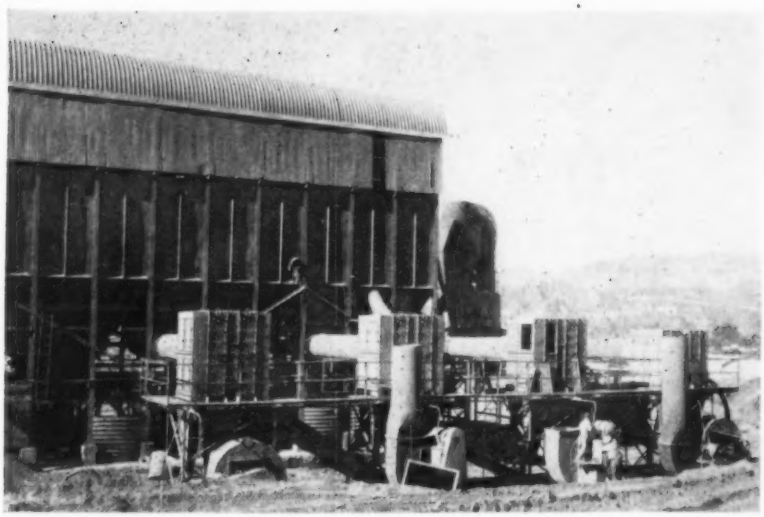

This picture was taken while the four secondary dust collectors were being installed at the Rocklite plant. Each of the units houses 120 miniature cyclone tubes. One of the primary cyclones is seen at the right.

High Dust Recovery Rate Reported At Rocklite with Multiple Cyclones

Rocklite Products, Ventura, Calif., leading producer of expanded-shale aggregates in southern California, recently re-vamped the dust-arresting system of its kilns.

Rocklite operates four rotary kilns at the Ventura plant to expand raw shale particles. Exhaust gases from the kilns, in the 350-400 deg. range, are subject to primary treatment in 8-ft. diameter cyclones, one for each kiln, which extract about 90 percent of the dust. Secondary de-dusting before the gases are released was formerly handled by a wet-type collector.

Because of the high cost of water mounting maintenance expense, etc. the company abandoned the wet-collection method, and in its stead installed a battery of four Dustex Corp. collectors, each having 120 miniature (18-in. long) white-iron cyclone tubes.

Exhaust fans, one on each Dustex assembly, pull the gases through these units and discharge the clean air through short steel stacks. With the larger primary cyclones extracting the heavier particles, and the Dustex collectors taking out most of the remaining micro-size fines, the combined operation now has high overall efficiency. Laboratory tests have shown that the recovery is well within the rigid requirements of the Los Angeles County Air Pollution Control Commission.

Completion of the final phase of the dust-control system is now in progress, involving the storage, handling, and controlled disposition of the collected fines. When these problems have been satisfactorily resolved, the plant should be well on its way to dust-free operating conditions.

Another view of the collector installation at Rocklite, seen from the other end of the bin housing.

Missouri Limestone Producers Elect R. W. Holub President

R. W. Holub, Concrete Materials & Construction Company, Cedar Rapids, Iowa, was elected president for the coming year of the Missouri Limestone Producers Association at the 14th annual meeting of the association, held last December.

Mr. Holub is field representative for Concrete Materials & Construction Company's plants in southern Iowa and northern Missouri. Adolph Adrian, Adrian Materials Company, Incoporated, Jefferson City, Mo., was elected vice-president. Elmer Aussieker, Auxvasse Stone and Gravel Company, Auxvasse, Mo., was elected secretary-treasurer.

New directors for three-year terms, in addition to Mr. Holub, are William Thomson Jr., Dietz Hill Development Company, Kansas City, Mo., and Virgil Smith, Smith Quarries, Belle, Mo.

Six associate members presented a panel discussion of all phases of quarry operations, and a discussion of the new aglime program of the Missouri ASC was led by John Kendrick, program specialist. The proposed 20-year highway program was discussed by Rex Whitton, chief engineer of the Missouri State Highway Department. Robert Koch, president of the National Agricultural Limestone Institute, Washington, D. C., was also a speaker. A discussion of the new tariff schedule for dump trucks was conducted by George Fox of the Public Service Commission.

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New Diatomaceous Completed by

RECENT initial operations of the new diatomaceous earth processing plant of the Eagle-Picher Company near Lovelock, Nev., marked the culmination of a development program that had its inception almost exactly five years ago. Representing an investment of approximately $2,500,000, the plant has an annual capacity of 36,000 tons of natural and calcined diatomaceous earth products.

In the late fall of 1953 the deposit, located about 15 miles northwest of Lovelock, was brought to the attention of Eagle-Picher officials. Subsequent prospecting and extensive exploration disclosed what is described as one of the largest and highest quality occurrences of its type to be discovered in 30 years.

Numerous test holes were drilled in the area, and calculations of mineral reserves and spoil volume were made. The materials sampled from the test borings were also processed through a pilot plant constructed by Eagle-Picher for that purpose, and the products made were entered in an industry-wide marketing survey. All factors from deposit to pilot plant product indicated the feasibility of establishing a new operation, and a contract was awarded to Kaiser Engineers for the design and construction of full-scale production facilities.

Construction was started early in December, 1957, and was virtually completed when initial operations began last September. The plant design features extensive instrumentation and control systems, compact processing flow, a kiln described as the largest in the diatomaceous earth industry, automatic pallet handling, and a high degree of dust control. Provision was also made for future expansion, without disruption of existing installations and processing.

Established for production solely of high-quality filter aid materials used in such industries as chemical, pharmaceutical, brewing, sugar-refining, etc., the Lovelock quarry and plant is Eagle-Picher's second diatomaceous earth facility in Nevada. The other, near Clark, has been in operation for several years and markets a line of products under the trade name Celatom. These are sold to polish manufacturers, the ammonium nitrate industry, calcium silicate insulation producers, and paper manufacturers. Other products include industrial absorbents, lightweight aggregates, and certain specialized applications.

At Lovelock, the basic phases of the operation center on milling, drying, and classification. Complexity of processing is directly related to the unusual characteristics of the raw material. Diatomaceous earth is made up of the siliceous skeletal remains of microscopic uni-cell plants known as diatoms. These sank and accumulated on certain sea floors of past geologic ages as marine deposits. In filtering applications the tiny cells provide a path for the liquid being filtered through submicroscopic openings, and they can therefore retain particles of submicroscopic size carried in the liquid. To produce the most effective filtering media, the raw feed must be reduced as nearly as possible to individual diatoms without breaking their shells; and clay, sand, organic matter, or other foreign material present must be removed.

In essence, the goal in processing is to produce a clean, dry finished product of proper structure and size range. While the latter varies for different end products, it generally falls between 1 and 20 microns.

Selectively mined crude ore is brought to the receiving hopper at the plant in 84-cu. yd. capacity bottom-dump trailers, and is transferred *via* a belt conveyor and bucket elevator system to storage bins of 25,000-cu. ft. capacity. In

Formally dedicated in October, 1958, the new Lovelock plant is the second such plant operated by Eagle-Picher in Nevada. The other is at Clark Station, a few miles from Reno.

Earth Plant Eagle-Picher

the first stage of the flow the crude ore is delivered to a hammermill in which it is reduced to a top size of ⅜ in. Subsequently the milled material is conveyed in an airstream to a 9-ft. diameter separator. Here, dust is separated and the relatively coarse material is then dropped into a hot air stream. Drying is accomplished as the feed is ducted to another cyclonic separation phase.

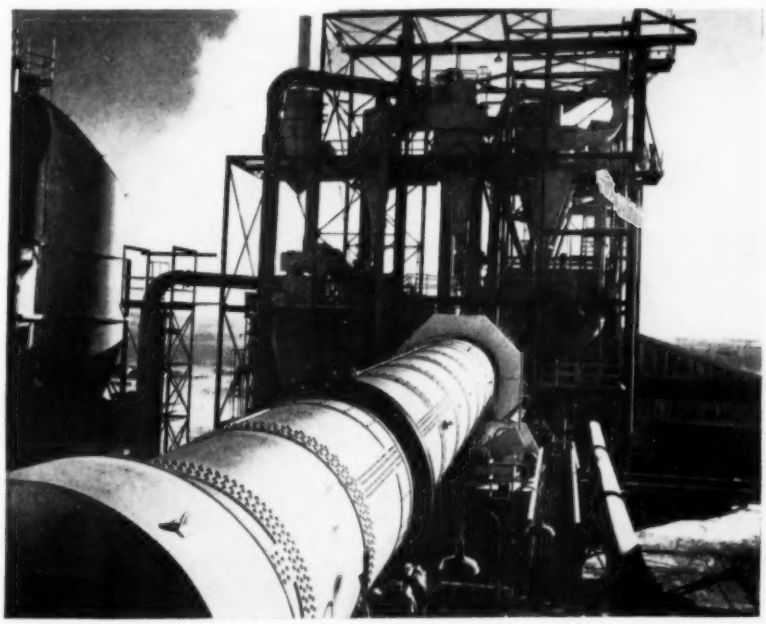
In the latter, any lumps remaining in the flow are separated from the properly sized material, which may go either to the finish end, or be fed to the kiln for calcining and then pass to the finish end. The lumps removed in the phase just noted are put through a following separator for elimination of any clay lumps, pebbles, or other extraneous material, and are returned to the milling circuit, from which they re-enter the flow described above.

Finish end processing involves operations and equipment similar to that of the initial phases; and, depending on the finished product desired, the material may be further milled and classified. The calcining phase, however, involves a 9- by 120-ft. oil-fired rotary kiln in which a prepared feed is calcined at a temperature of about 2,000 deg. F.

Among the various effects of this processing is the burning out of minute impurities not previously removed or the fusing of them into a slag which is readily removed by the finish end equipment. In addition, smaller particles (broken dia-

(*Continued on page* 130)

One of the 84-cu. yd. bottom-dump trailers in which the crude ore is brought to the plant site. At the left are the bins that provide more than 25,000 cu. ft. of ore storage capacity.



This rotary kiln, said to be one of the largest in this industry, is 9 ft. in diameter and 120 ft. long. Housed in the open framework, background, is some of the drying and classifying equipment.

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Tiger Brand Amerclad Cord and Cable consists of flexible, rubber-insulated conductors encased in a tough, resilient protective jacket of Amerprene, an oil-resistant compound of extreme density and toughness that is both moisture-proof and fire-resistant.

For more information, get in touch with your American Steel and Wire salesman. Or write direct to American Steel & Wire, 614 Superior Ave., N. W., Cleveland 13, Ohio.

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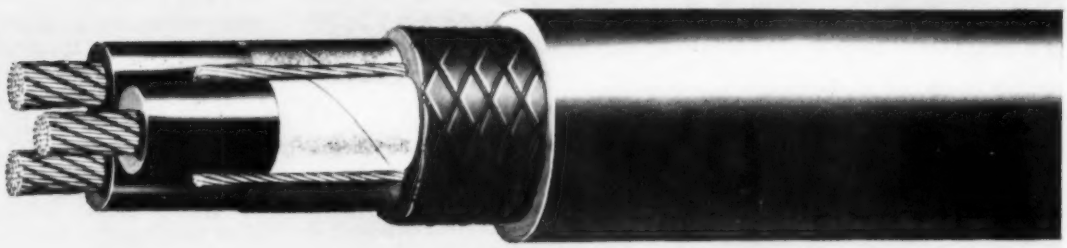

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Close Feed Control Boosts

By BUREN C. HEROD

After removal of overburden by tractor-drawn scrapers, primary 6-in. blastholes are drilled with this equipment on a 15- by 30-ft. spacing. Routine shots carry an average of 30 holes and yield about 4 tons per pound of explosives.

ANOTHER ON THE SPOT REPORT

ONE of the most carefully and efficiently controlled aggregate production flow lines in the crushed stone industry may be found in the Reed Crushed Stone operation at Gilbertsville, Ky. Designed, built, and operated by Clyde W. Reed, who is universally described by his associates as one of the hardest working producers in his area, the present plant in effect has only its location in common with the original facility erected about 8 years ago.

Since initial operations in 1951, when daily production amounted to about 1,000 tons, a continuous series of revision and expansion programs has been undertaken. The last of these, completed about two years ago, saw the daily capacity brought to a point more than seven times that of the original operation.

With its close control of all phases, the present plant reflects the extensive efforts expended in the interest of attaining peak efficiency, as well as greater production. At each stage in the flow, feed to the processing equipment—all screens as well as all crushers—is delivered by Syntron feeders regulated to desired rates by Mosher controls in a central power station. In addition to this control of feed, an accurate record of stone input to the processing flowline is maintained

A general view of the plant from a point near the quarry haulage ramp. At the right is the primary crusher installation, and at the left is the scalping tower. Oversize from the latter is chuted to one side and falls to a pile on the quarry floor, as shown. This is subsequently reclaimed by an auxiliary loading shovel.

Reed Crushed Stone Company

regulates flow at every point between primary crusher and finished product bins

Production Efficiency

through direct measurement by a Trans-Weigh Co. belt meter installed on the reclaiming tunnel conveyor under the plant feed surge pile. At no point between the primary crusher and the finished product loading bins is there an unregulated flow of material.

Despite his own obvious personal drive, given testimony by the record of constant improvement of the plant, Mr. Reed credits much of the success and efficiency of his operation to the help and advice furnished him by his major equipment suppliers. Prior to organizing this company, he had been engaged in contracting activities. A background in crushed stone operations was also developed during his earlier employment with another crushed stone producer.

Paramount among the factors

As seen in this quarry view, the dolomitic limestone deposit is largely massive, and quality material is available to a depth of nearly 260 ft.

Throughs from the scalping screen, left, drop to the plant feed surge pile, from which they are reclaimed for transport to the first secondary reduction stage, right. A belt meter in the reclaiming tunnel measures plant input.

contributing to Mr. Reed's selection of the Gilbertsville site for his plant were the potential market—aggregates are produced for customers in Kentucky, Indiana, Tennessee, and Missouri; available transport—shipments can be made via rail, truck, and barge; and the availability of top-quality raw material which is meeting the specifications in all areas noted above.

Included in the wide range of material produced are several sizes of aggregates, riprap, bituminous concrete seal chips, and agricultural limestone. While specification aggregates are made in accordance with requirements of those sections of the various states the plant serves, the average size range of material produced is from 1-in. down to dust.

A considerable portion of the plant's output has been delivered to large federal construction projects, such as the Kentucky Lake Dam, and the potential for similar consignment of material is considered good. The remainder of production is marketed for commercial construction, road building and maintenance, and agricultural uses.

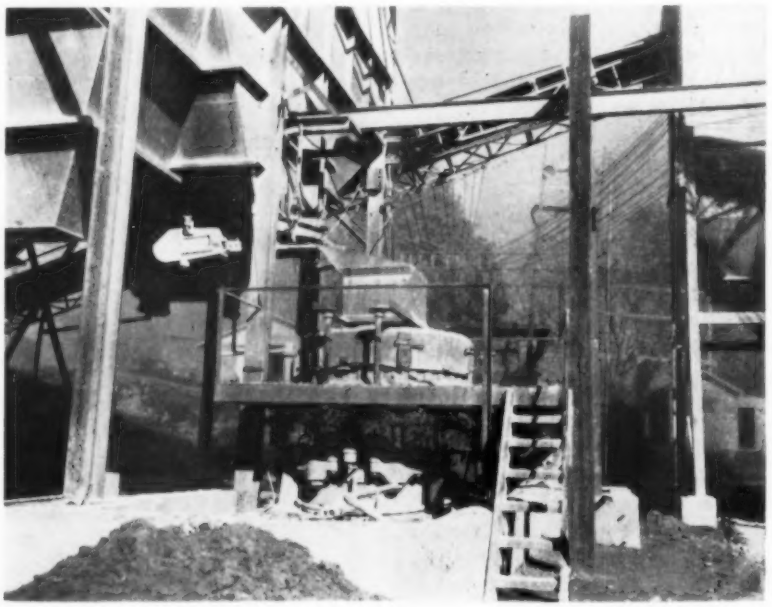
As shown by accompanying photographs, the quarry operation is conducted in a massive well-bedded deposit which has allowed establishing a ledge averaging well over 150 ft. in height. Approximately 400 acres of dolomitic limestone are available to a depth of nearly 260 ft., all of which qualifies for specification material.

Preparation of the surface and removal of overburden is done under contract by crews with Caterpillar tractors and pan scrapers. Primary blast-hole drilling, based on a pattern of 6-in. holes on a 15- by 30-ft. spacing, is handled with an Ingersoll-Rand Drillmaster. On the average, 30 holes are drilled for each shot, and are charged with Atlas 60 percent Giant gel below, and 40 percent dynamite in the upper sections. The yield ratio has averaged 4 tons of stone per pound of explosive, with quite satisfactory breakage, as illustrated.

Two separate loading phases are established in the quarry. At one point a shovel is engaged in loading out the scalping screen oversize, as required. This material has been discharged over the highwall into the quarry, as described later. At the other point, the working face, primary loading is handled by a 3-cu. yd. Bucyrus-Erie diesel shovel. Four 10-cu. yd. Euclid end-dump trucks haul the quarry-run stone up a ramp from the quarry floor to a hopper above the primary crusher installation.

The latter was set up at the top of the quarry and near the plant site. From the hopper, the stone is transferred on a 48-in. feeder to the 42- by 48-in. primary jaw crusher—both Lippman units. The primary, like most other units of processing equipment in the plant is driven by

Typical of the close control of feed to all processing equipment is this view showing a vibrating feeder supplying a tertiary crusher, which has as its main products seal chips and agstone.



an Allis-Chalmers motor—in this case a 200-hp. drive. The plant has a total of nearly 1,150 hp.

Crusher discharge is transferred by a No. 55 Syntron feeder to a 42-in. by 380-ft. inclined belt conveyor for transport up to the scalping tower. All conveyors in the plant flow are fitted with Manhattan belting, and at the time of this writer's visit, the No. 1 belt above had already handled over 1,000,000 tons.

At the top of the scalping tower the stone is discharged on a 4- by 12-ft. Simplicity single-deck screen with 7-in. openings. Oversize, about 7- by 12-in., is chuted to one side, and drops to the quarry floor. This material is then reclaimed as needed by the auxiliary quarry shovel.

The stone passing the scalping screen drops to the underlying plant feed surge pile. Of the average 15,000 tons of material contained in this pile, about 5,000 tons is live storage. This is drawn into a reclaiming tunnel *via* a pair of No. 55 Syntron feeders for transfer to a 36-in. by 105-ft. plant feed conveyor. As noted earlier, the rate of feed is regulated from a central control point.

From the reclaiming and feed conveyor, the stone is discharged to a Nordberg 5½-ft. standard cone crusher which in turn discharges to a 30-in. by 130-ft. belt on which the product is carried to the primary screen. The latter, a 5- by 14-ft. Simplicity double-deck unit fitted with 2-in. and 1-in. opening top and bottom deck screencloth, is mounted above a set of three bins into which the respective separated fractions are chuted. Both larger fractions are delivered at a controlled rate from the appropriate bins by No. 45 Syntron feeders to a pair of Symons 4-ft. standard cone crushers. Minus 1-in. material is drawn from the center bin and transported, in a separate flow, by a series of three conveyors to another screening tower.

The latter installation consists of a set of four 105-ton bins supporting a pair of 4- by 14-ft. triple-deck screens. These identical Simplicity units are fitted with similar screencloth on corresponding decks, *i.e.*, ½-in., ¼-in., and 8-mesh on the top, middle, and bottom decks, respectively. The various fractions separated are chuted to the appropriate underlying bin, the one containing the largest size being used to provide a direct feed *via* feeder to a Gyradisc crusher. Products of this crusher, basically seal chips and aglime, are then returned to the two triple-deck screens.

Discharge from each of the 4-ft. standard cone crushers noted above is received on separate belts from which the flow is split to a set of three conveyors for transport to a third screening tower. At this point each belt discharges to the respective one of three 4- by 14-ft. triple-deck bin-supported screens.

Middle and lower decks of all three screens are similarly equipped with screencloth of ½-in. and ⅛-in. openings, respectively. Two of the top decks have 1-in. opening screencloth, while the other makes a top separation of 1½-in. Products are chuted to the appropriate bin, one of which is used to provide additional feed for the Gyradisc crusher.

In addition to direct truck loading from the various bins, materials in stockpiles are rehandled into delivery units by Michigan 175A front-end loaders. Shipments destined for river transport are trucked from the plant site to a barge-loading station on the nearby Tennessee River.

Under Mr. Reed's personal supervision, this efficient and closely controlled facility has been operating two shifts a day, with a crew of 25 to 30 men.

Stockpiled products are rehandled by front-end loaders. The unit shown here is working from an agstone pile. A water spray installation is provided to wet the surface of loads to allay dust during transport.

Another general view of the plant. The central structure houses the primary screen, while those at the left and right contain five finishing screens.

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International Harvester Co.
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A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Power for steep grade climb-outs wins steady job for five "65's"

Bonus Turbo Charged Diesel power to deliver extra-tonnage loads up a haul road with a 17% average grade accounts for the dependence of Caldwell Engineers on five "65" Payhaulers—on the $13 million hydro and flood-control Oliver Dam, Columbus, Ga.

Contractor doubles load delivery speed with positive Torqmatic braking!

Central Pennsylvania Quarry and Stripping Co. credits *Torqmatic braking* of their 5-unit "95" Payhauler fleet with doubling load delivery speed—by increasing safe downhill hauling speeds! They've compared "95's" directly to other off-road equipment on rock-hauling duty!

features ownership!

Prove what it means to command the Payhauler ratio of power to payload—for hauling up to 25% faster; beating grades and altitude. Try Payhauler "pick-up-truck" spotting ease—"zip-around" power steering—exclusive high reverse—and all the other Payhauler advantages. See your International Construction Equipment Distributor for a demonstration!

High-percentage availability proves inbuilt stand-up-ability!

98.5 work availability through one measured 12-week period is the mark set by a 10-unit "95" Payhauler fleet—high-balling rock over steep High Sierra grades, on mammoth Pool Hydro Project, for Southern California Edison Co. Such records result from reserve power, reserve frame and transmission strength, and reserve shock-resistance!

Another thirty "95" Payhaulers join Merritt-Chapman and Scott fleet!

Merritt-Chapman and Scott Corporation has added thirty more "95" Payhaulers to their Niagara Power project equipment spread. Now, the M-C and S Payhauler fleet totals 62 units—largest in the world! On St. Lawrence Seaway, huge Glen Canyon dam, and Niagara Power Project, M-C and S have proved rock-lugging, grade-beating Payhauler performance—and confirmed their satisfaction with repeat orders.

WONDERWALL™ REDUCES

WONDERWALL is the great, new multiwall bag from West Virginia Pulp and Paper. WONDERWALLS outperform ordinary bags because they're made of Clupak* kraft paper that stretches. This Clupak paper enables a WONDERWALL bag to stand up under walloping impacts and manhandling punishment that break ordinary multiwalls.

Mr. W. T. Wyman, Purchasing Director of the Peerless Cement Co., a Division of American Cement Corp., at Detroit, says: "We checked the WONDERWALL for breakage in every step of our production—from the line to the dealers' warehouses. We were pleased to find that we were getting a reduction in breakage of about 80%, and we used about 600,000 WONDERWALLS in our operation in 1958."

Mr. Wyman (*right*) and Mr. C. M. Buchanan, packhouse foreman, are pictured in the warehouse containing WONDERWALL bags. Peerless has been using a regular kraft multiwall 3/40 and 1/50 for a total weight basis of 170 pounds, while the WONDERWALL bag is 3/50 for a total weight basis of only 150 pounds: "In our opinion, the WONDERWALL more than compensates by its strength," Mr. Wyman says.

Peerless cement—in WONDERWALL bags—comes from the conveyor to the truck loader. There's an absolute minimum of trouble here because of WONDERWALL's great strength and built-in stretch. Mr. Wyman puts it this way. "Our experience indicates that the strength of the WONDERWALL is such that with one ply *less* than standard kraft, it still is stronger."

WONDERWALLS come off the conveyor and are loaded on a Peerless truck for shipment. "In loading, as in packing and handling, breakage is reduced so much with WONDERWALL bags that Peerless is satisfied with their superiority," Mr. Wyman declares.

BAG BREAKAGE 80%!

The WONDERWALL places easily on the packing spout because of the paper flexibility. "Fifteen seconds of stoppage means a delay in filling five bags. With WONDERWALLS, we've maintained more consistent production than was possible formerly. The improvement is the result of continuing production through reduction of breakage," Mr. Wyman notes.

Containing 94 pounds of cement, each bag is dropped from the packing machine to a moving wire-mesh conveyor belt. This is another place where ordinary multiwalls are subject to breakage that means a time and money loss. WONDERWALLS demonstrate their special ability to take punishment every step of the way.

Cement travels safely in WONDERWALLS! Those bottom bags are subjected to great weight, but WONDERWALLS deliver the goods to the customer in sound shape. Mr. Wyman reports: "We checked a customer's warehouse and found WONDERWALL bags stacked nine high on two bags lying on their sides and tilted to allow easier hand-truck handling. For all the weight those bottom bags had to support, not one was broken."

Besides reducing breakage, WONDERWALLS pack faster, handle easier and stack firmly. Best of all they don't cost a penny more!

Try this superior new multiwall . . . *you have so much to gain*. Order a trial shipment of 5000 WONDERWALLS on your next carload. Write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y.

West Virginia Pulp and Paper

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority.*

In-Plant Aid from

By JOSEPH A. FERNANDEZ
Personnel and Safety Supervisor
National Gypsum Co., St. Louis, Mo.

THE subject of off-the-job safety still remains a relatively unexplored land in the world of industrial safety. In so many respects, it has been our blind side—an area, perhaps a trifle too far removed from the actual plant situation to explore—but I submit that the realm of off-the-job safety is well worthy of thorough examination. When combined with a sound industrial safety program, the benefits of in-plant aid from off-the-job safety can be reaped.

Training for Safety Habits As a general premise, it can be stated with accuracy that the goal of our safety program is to train each employee, through the medium of sustained education, to perform in a given manner. Included in this definition of sustained education are not only formal and informal training techniques, but all promotional activities which seek to instruct or to control employees' actions. Eventually, as a product of these educational efforts, we expect to inculcate a form of a conditioned response commonly referred to as "safety consciousness." In essence, we are attempting to provide each employee with a complete set of safe habit or behavior patterns applicable to the plant situation. We strive to channel our employees' actions in a pre-determined direction. When we seek to instill safety consciousness, we are truly engaged in the battle for men's minds.

An analysis of accident prevention programs reveals that safety consciousness, at best, is considered a highly perishable commodity—a commodity which may endure for days or weeks, but in any case, one which requires constant attention.

Safety—a Full-Time Effort Underlying most safety programs is the fundamental tenet that if an accident prevention program is to endure, we must constantly keep the subject of safety before our employees' eyes. But how perishable is this precious commodity, "safety consciousness"? Do unsafe practices off the job tend to weaken industrial safety programs? The overwhelming influence of unsafe habits off the job could well serve to break down the habit pattern we attempt to create in our safety program. It is generally agreed that an employee who disregards safety off the job does not by some mystic process evolve into a safe worker when he punches the clock.

If we believe that safety is a full-time proposition—that it cannot be turned on and off during the course of a work day—is it reasonable to expect that it can be cut off at the end of the work day for a prolonged period, and at a given moment, at the outset of a new work day, resume its natural flow unretarded? These are questions which merit close scrutiny. However, it would appear that all of the benefit of a concerted safety effort could easily have been dissipated during off-the-job hours and replaced by an incompatible set of unsafe habit patterns. Furthermore, employees seeking to serve two masters—those who are willing to attempt "part-time safety consciousness"—provide a more elusive target for training efforts than others.

Program For Home Safety Thus far, we have dealt largely with the theoretical aspects of the subject. Now I would like to acquaint you with the Home Safety Program which has been in operation at our St. Louis plant for several years.

Our interest in off-the-job safety did not arrive as a sudden inspiration, but appeared by gradual revelation. Although we were aware of off-the-job safety activities in various industries, in-plant safety was generally divorced from off-the-job activity. Basically, our thinking was somewhat closed and compartmentalized. We deluded ourselves into believing that we were dealing with two distinct entities. . .

During an appraisal of our group insurance program, we were awakened to the fact that disabling injuries occurred four times more frequently off the job than on the job. For the two years immediately preceding the study, and contrary to

Off-the-Job Safety*

nationwide trends, the average time lost per case was 63 days for injuries away from work, compared with approximately 9 days for work injuries. In addition to the obvious human aspects of the situation, genuine cost factors were facing us—not only the direct dollar costs to the group insurance experience, but the myriad indirect costs, such as overtime, training of replacements, spoilage, absenteeism, etc.

Article Starts Trend An approach to this challenging problem came to us from an unexpected source. It was in the form of a poignant article entitled *Bare Hand Contact,* authored by the wife of a telephone lineman who narrowly escaped death by electrocution on the job. Cleverly interwoven in this true account was a striking theme. Although the wife had not realized it, she played a key role in her husband's safety, but had failed to fulfill the role, simply because she was not fully aware of it.

She had always assumed her husband would return home from the job safely but at no time had she used a positive approach to ensure his safe return. The company accident prevention program was a vague concept with which she was familiar but not intimately concerned. Unfortunately, her influence was far greater than she had been made to realize.

The article aroused sympathy, but it also raised some rather searching questions, such as, "Why was the wife unaware of her key role, and how many others are in a similar position?" If we had failed to enlist the services of those willing to serve the cause of industrial safety, we had overlooked a welcome support for our efforts.

An off-the-job safety program seemed to offer a constructive approach to the problems uncovered by the insurance audit and a positive answer to the questions raised by the enlightening actual experience described in the article. Our Home Safety Program was thus launched.

Cardinal Points The organizational campaign took the following tack:

❶ The full co-operation and unremitting support of all levels of plant management were cultivated at our weekly staff meetings. When an appropriate degree of success was achieved, the idea of off-the-job safety was introduced by first-line supervision during individual contacts and group safety meetings.

❷ The importance of off-the-job safety and its relation to on-the-job safety was outlined in a letter to all families. A copy of the article dealing with the lineman's accident was enclosed, along with an appeal for the formation of Home Safety Committees.

❸ A concerted drive to register Gold Bond Home Safety Committees followed. As you know, all of our products are sold under the Gold Bond label. A drawing for which only registered Home Committees were eligible was announced, and valuable prizes were awarded. The project received ample publicity through slingers, special display prizes, monthly safety bulletins, etc.

❹ Gold Bond Home Safety Committees were enrolled, and certificates were mailed to each family. The name of each family member appeared on the certificate, with one member designated as chairman. We were pleased to enroll 90 percent of all our families.

❺ Home safety is an integral part of our accident prevention program. A member of our Plant Safety Committee serves as chairman of Home Safety Activities. It is considered a regular part of all of our safety activities. Some of the special promotional techniques we have used are off-the-job safety films, monthly safety letters to each family, special home safety contests, and off-the-job safety literature—particularly those published by the National Safety Council. All of our incentive awards are of the type that can be enjoyed by the en-

(*Continued on page* 126)

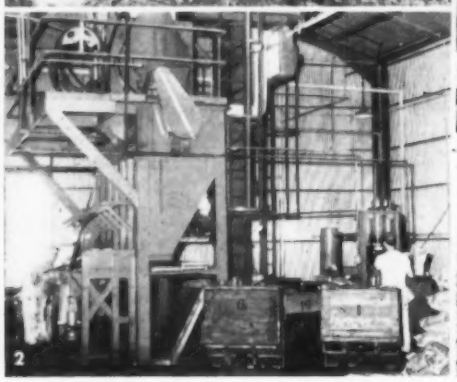
* Presented at the 46th National Safety Congress and Exposition—Cement, Quarry and Mineral Aggregates Section, October 21, 1958.

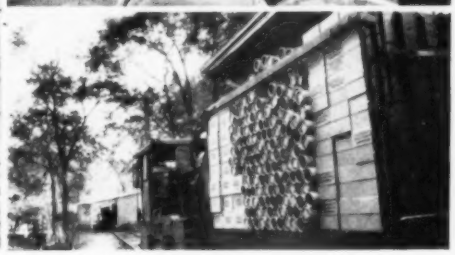
CYANAMID

Explosives News

CYANAMID'S NEW CASTLE EXPLOSIVES PLANT INCREASES MANUFACTURING CAPACITY

In construction, mining and quarrying, the increased need for high quality industrial explosives continues to grow. To meet this demand, Cyanamid has recently completed a building and expansion program that includes a new ammonium nitrate plant, as well as many new types of equipment, processes and other facilities. Shown here are a few photographs of the mighty 535-acre New Castle explosive manufacturing operations.





1. One end of the tank battery, the refrigeration plant and storage facilities for glycerine and glycol. Partly hidden by trees (left center) is the gelatin line warehouse and gelatin line dope house.
2. The blasting agents building, where work is being done with an insensitive explosive. To detonate this mixture, a large priming charge of high explosives is required.
3. One of the large wooden chaser-mill type mixers in the dynamite mix house. Here nitroglycerin and nitrocotton are mixed with the "dope" as it comes from the dope house for processing. After mixing, the explosive has been formed. As dynamite, it is taken by tram line to the pack houses.
4. Here packaged explosives are shown on their way by tram to the storage magazine.

Cyanamid customers can be assured of highest quality and unequalled nationwide service now and in the future.

AMERICAN CYANAMID COMPANY

EXPLOSIVES AND MINING CHEMICALS DEPARTMENT

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

Photo Number 2 by Jack Simon, New Castle (Pa.) News

SALES OFFICES:

Bessemer, Alabama
Denver, Colorado
Kansas City, Missouri
St. Louis, Missouri
Missoula, Montana
Albuquerque, New Mexico
New York City, New York
Tulsa, Oklahoma
Latrobe, Pennsylvania
Pottsville, Pennsylvania
Dallas, Texas
Salt Lake City, Utah
Bluefield, West Virginia

PLANTS:

Grafton, Illinois
Latrobe, Pennsylvania
New Castle, Pennsylvania
Springville, Utah

High Explosives
Permissibles
Seismograph Explosives
Blasting Agents
Blasting Powder
Blasting Caps
Electric Blasting Caps
Blasting Accessories

Cyanidation Process Chemicals
Flotation Reagents
Flocculating Agents
Film Forming Agents
Surface Active Agents

More Information, Please

Use postcard to obtain literature or details about equipment and products reported in this issue.

"ENGINEERING PROPERTIES OF NI-RESIST DUCTILE IRONS" a 28-page booklet containing the complete story of this new, high-strength cast metal, is available from *The International Nickel Company, Inc.* Tables and graphs explain mechanical and physical properties, erosion and corrosion resistance, and high temperature strength. **(301)**

NEW SYNTRON-SINEX VIBRATING SCREEN literature available from the *Syntron Company* gives complete data and electrical and mechanical specifications for the two single- or double-deck models available with two power rated drives. Also contained is information pertaining to accessories, such as electrically heated screen cloth, feed hoppers, and fines collecting pans. **(302)**

A WIRE ROPE INSPECTION PLAN which increases the effective service life of wire rope is offered in Red-Strand Service Bulletin No. 104, issued by the *Leschen Wire Rope Division, H. K. Porter Company, Inc.* The illustrated bulletin explains when inspections start, how often they should be made, and how they should be reported. A check list of the things that should be done each time an inspection is made and useful information concerning evaluation of the findings are included. **(303)**

BELT CONVEYOR IDLERS BOOK 2176, available from the *Link-Belt Company* contains engineering selection data on 5 new series and 23 types of belt conveyor idlers for belt widths of 14 in. up to 84 in., and illustrates their versatility for a wide range of conveyor applications. **(304)**

PRESSURE REGULATORS are covered in a 36-page catalog available from *Air Reduction Sales Company.* The illustrated booklet contains flow and pressure specifications, as well as inlet and outlet connection dimensions for each regulator. Adaptors, station valves, flowmeters, hose connections, and pressure gauges are detailed. **(305)**

A MONTHLY TIME AND COST RECORD BOOK has been prepared by *Caterpillar Tractor Company* to assist operators in determing the cost of owning and operating equipment. Twelve sets of pages are included on which to record day by day each month's individual machine expenses for an entire year. An annual summary sheet provides space for entering the totals for each month to obtain annual cost figures. **(306)**

FLOTATION EQUIPMENT is described in a new booklet available from the *WEMCO Division of the Western Machinery Company.* The 8-page bulletin describes the principle of the flotation process for selectively separating finely divided mineral particles as well as the design, construction, and operating characteristics of the Wemco Fagergren flotation cell. **(307)**

CRUSHERS AND PULVERIZERS manufactured by *Day Pulverizer, Inc.,* are detailed in a bulletin containing illustrations, specifications, and dimensions. **(308)**

ADJUSTABLE STROKE DIAPHRAGM PUMPS in a large range of sizes from 1 to 10 in. and in capacities from 2½ to 1,000 g.p.m. are covered in Bulletin No. P8-B19 from the *Denver Equipment Company.* Dimensions and specifications are included. **(309)**

February ***PIT AND QUARRY*** **1959**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS

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Name_____ Title_____

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431 South Dearborn Street

CHICAGO 5, ILL., U.S.A.

More Information, Please

Use postcard to obtain literature or details about equipment and products reported in this issue.

THE TORQUE CONVERTER AND ITS APPLICATION TO SHOVEL-CRANES is explained in a 16-page booklet just issued by the *Link-Belt Speeder Corporation*. The illustrated booklet offers tips to assist an operator in getting greater production with less effort from a machine equipped with an engine-converter combination. Also included are maintenance tips and an introductory explanation of what torque is. **(310)**

ELECTRIC VIBRATING FEEDERS AND CONVEYORS are covered in 96-page Catalog 930, released by *The Jeffrey Manufacturing Company*. Controls, installation methods, principles of operation, and individual unit specifications are included. Photos, line drawings, and installation views support the detailed exposition. **(311)**

A HIGH-INTENSITY MAGNETIC SEPARATOR of the induced roll type is described in a new bulletin just released by *Stearns Magnetic Products*. Supplemented by specification sheets, the 4-page booklet shows typical installations, explains the principle of operation, and suggests applications. **(312)**

TORQUE CONVERTER SLACKLINE CABLEWAY INSTALLATIONS are described in Brochure TC-1, just released by *Sauerman Bros., Inc.* Haul distances of up to 1,000 ft. and digging depths of 90 ft. are covered in sand and gravel plant stories. The brochure also gives typical operating costs for the Slackline Cableway and contains a layout drawing of a representative installation. **(313)**

HOW IMPROVED MATERIALS HANDLING PROCEDURES resulted when certain types of pneumatic equipment were arranged in selected combinations to supplement each other is discussed in a 12-page booklet from the *Fuller Company*. An A.S.M.E. publication, the bulletin discusses applications of the Air-Slide pump and the Air-Slide horizontal fluidizing conveyor. Photographs and diagrams show details of the new systems and various installations. **(314)**

CHICAGO BUCKETS, INC., has published a booklet describing its line of Dual-Lever-Arm clamshell buckets for digging, rehandling, and general purpose use. Construction features, illustrations of the various models, and recommended applications for each type of bucket are included. **(315)**

SPROCKETS, DRUMS, WHEELS, GEARS, and other hardened products manufactured by the *Tool Steel Gear and Pinion Company* are included in Bulletin 452, showing TSP products and their applications in the cement industry. **(316)**

SYNCHRONOUS GENERATORS, available in ratings of 187 k.v.-a. and larger are described in a product publication prepared by the *Electric Machinery Manufacturing Company*. Built in either single- or three-phase ratings, the machine will operate at either 60 or 50 cycles. **(317)**

A 1,200-C.F.M. PORTABLE ROTARY AIR COMPRESSOR is described and illustrated in a new specification sheet issued by the *Le Roi Division, Westinghouse Air Brake Company*. General specifications, weights and dimensions, and performance data are included. **(318)**

FIRST CLASS
PERMIT NO. 44
CHICAGO, ILL.

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NEW SUBSCRIPTION ORDER FORM

Send PIT AND QUARRY to me for

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____Payment enclosed ____Bill me ____Bill company

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Type of business
and products_____

*U. S., U. S. Possessions, and Canada only.

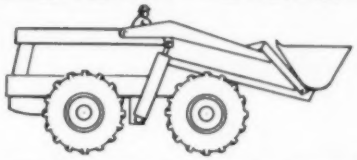
Pan American countries, $10 a year; elsewhere, $15 a year.

only the HYDRA-DRIVES® BDB

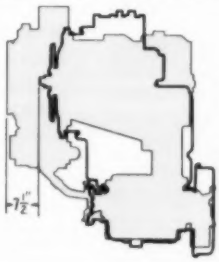
OFFERS ALL THESE MAJOR ADVANTAGES

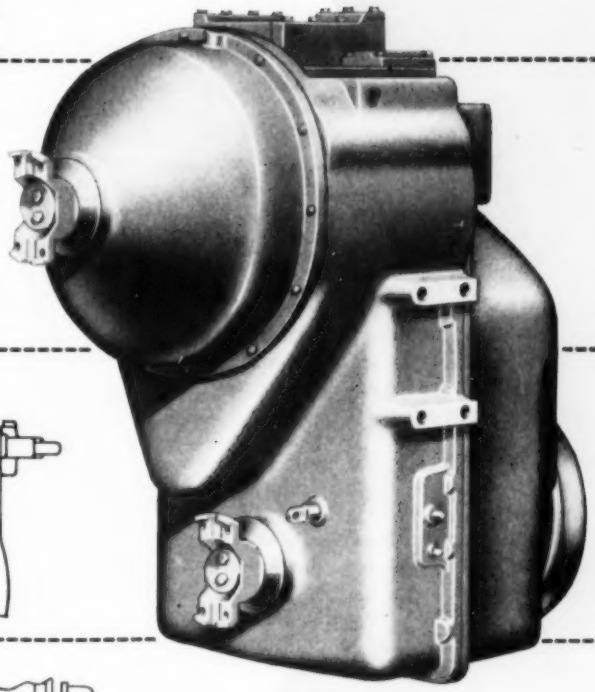
IN FULL-POWER SHIFT TRANSMISSIONS for equipment from 60 to 175 h.p.

4 speeds forward and reverse. All power shifted! Provides maximum horsepower to load under all load conditions.

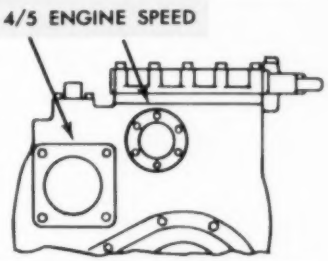


Integral design. Torque converter, transmission, oil passages, valving and oil sump are in *one* compact housing—7½" shorter than comparable models.

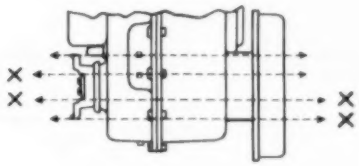




Dual reduced speed pump drives. Pumps can be driven at engine speed or 4/5 engine speed for longer life and increased horsepower to pump load. Single pump drive is also available.



Full disconnect provides four combinations of split drive . . . from torque on both shafts, to both shafts in disconnect.



SPECIALLY DESIGNED FOR SMALLER INSTALLATIONS

Rockwell-Standard's new model Hydra-Drives Full Power Shift Transmission is now available in sizes especially designed for smaller installations, such as front end loaders, fork trucks, scrapers, crane carriers, rubber tire tractors and military vehicles.

In addition, the Hydra-Drives BDB offers easier servicing and maintenance. There are fewer moving parts and bearings. The simple, rugged countershaft design and spur gears simplify maintenance.

HYDRA-DRIVES
ROCKWELL-STANDARD CORPORATION
TRANSMISSION AND AXLE DIVISION
DETROIT 32, MICHIGAN

© 1959, R-S Corporation

In-Plant Aid

(*From page 121*)

tire family. At present, the most common type of award is a gift certificate from a leading department store. It is our belief that even if the wife should splurge the certificate on a ridiculous hat, we would enjoy more—and possibly louder—publicity for our accident-prevention program.

❻ New employees are urged to participate in the program and are provided with registration material when they are hired.

❼ All families are encouraged to submit all safety problems to the plant Safety Department. Despite some rather knotty challenges, this phase of the program has enjoyed a high degree of success.

The Kids Help One of the most rewarding aspects of our off-the-job safety promotion has been the interest displayed by the children. Many of them take great pride in belonging to the Home Committee and are not at all hesitant to exercise their authority. We consider the children a valuable resource for sustaining interest in the program. The most important single step in creating a safer community is the development of safety consciousness in children.

In-Plant Progress Recorded Since the inception of the off-the-job safety program three years ago, we have enjoyed a considerable reduction in our in-plant frequency rate. Compared with the record of the three-year period preceding its adoption, the number of reportable injuries has declined 38 percent. However, the absence of improvement in the in-plant severity rate has been a puzzling but challenging enigma. During this same period, the severity rate has remained relatively constant, showing a reduction of less than 38 percent. However, recent trends serve to provide us with an optimistic outlook for a downturn in the severity rate similar to that in frequency. Only continued vigorous effort can convert this optimism into reality.

The reduction in the frequency rate is enhanced by the fact that a series of major modifications, including a substantial plant expansion program, were completed while this experience was compiled. Most of the work connected with the revision was performed by our own people.

Off-the-Job Progress Injuries off the job during a comparable period declined remarkably. In actual numbers, a 60 percent reduction has been noted. Of particular significance is the 87 percent improvement in the annual off-the-job *severity rate*. The reduction in the number of man-days lost from off-the-job injuries is probably the most important single contribution of our Home Safety Program. In terms of human suffering and overall plant economy, this contribution is immeasurable.

Obviously, an individual phase of a comprehensive accident prevention program does not stand alone; it is interlocked with all other safety factors to form an interdependent whole. For this reason, off-the-job safety, of itself, can not account for all of the improvement. However, all of our surveys and appraisals lead us to the conclusion that the Home Safety Program has exerted the most effective influence. It has molded a receptive atmosphere for the acceptance of related phases of the overall safety program.

Obstacles Perhaps one of the most significant obstacles in an off-the-job accident prevention program is the lack of appropriate training facilities, comparable to those available in industry.

Off-the-job safety norms established by many people are frightening when analyzed objectively. An alarming number of persons merely have vague concepts of "being careful" but are ill-equipped to recognize common hazards. Most human beings are creatures of habit, but these habits may be completely out of tune with ordinary safety standards. Who or what is to alter these unsafe influences? In many instances they are perpetuated, *e.g.*, by parents who caution their children to "be careful," but set a poor example when they drive an automobile. What can one expect from people with similar life-long experiences?

In industry we have a historical background to guide our accident-prevention efforts. Despite sporadic attempts at promoting off-the-job safety, however, an inspiring, united move to eliminate injuries during leisure hours has never taken hold. If an all-out effort of this type is to succeed, we shall need to make persons aware of the hazards they face in everyday living, as we have done so successfully with respect to the hazards in their occupations.

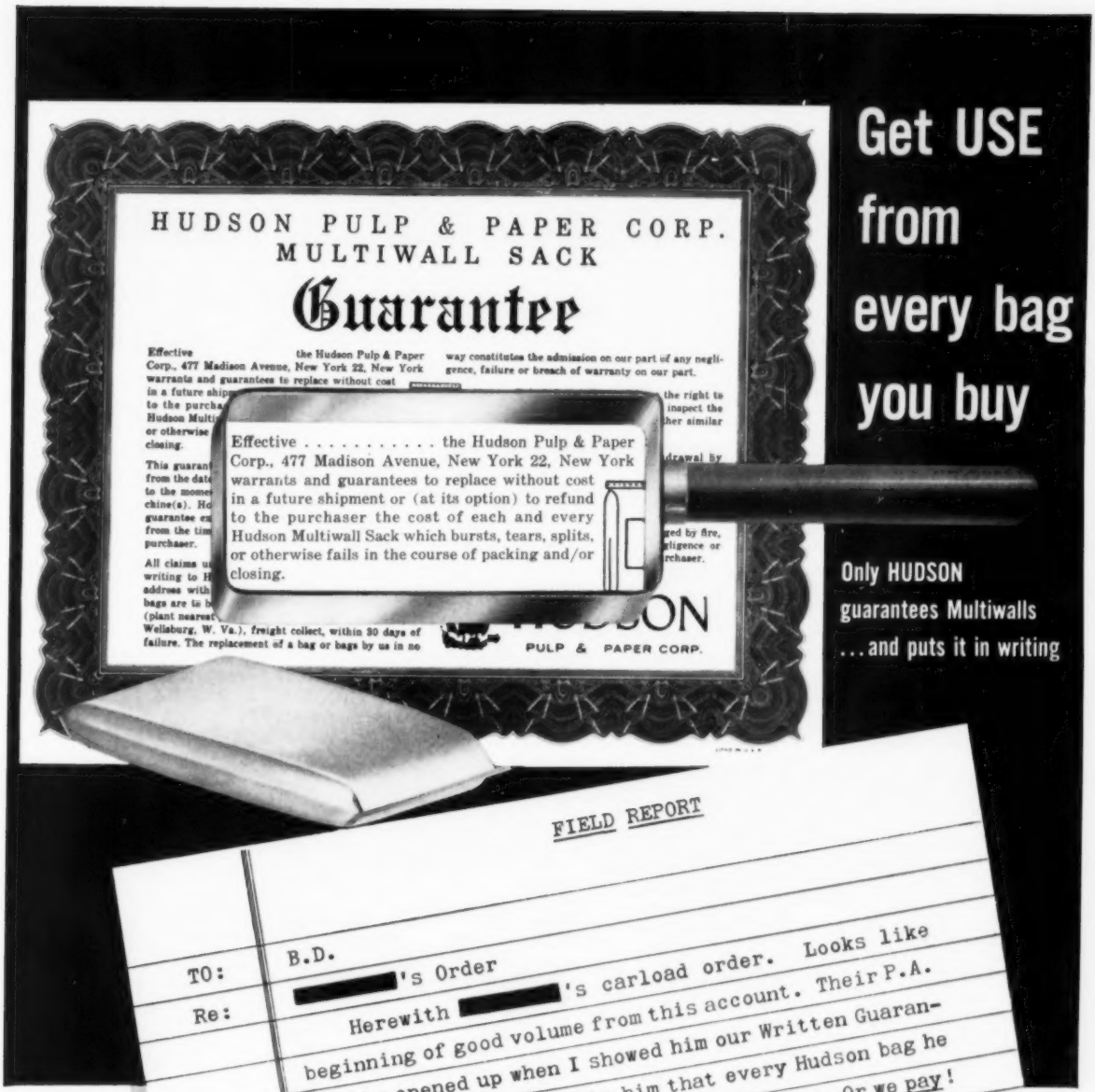
Perhaps our safety programs have not been extended far enough. Our efforts may be noteworthy, but what of our goals? Have they been adequate? It would serve the purpose of safety, I believe, if all of us would raise our sights and broaden our outlook. Off-the-job safety as an integral part of the plant accident-prevention program may provide a partial solution of many of the problems facing us. It appears to be an ideal source for equipping people to prevent *all* types of accidents effectively. In any event, full-time safety consciousness is a ready-made vehicle for introducing a concerted off-the-job safety movement.

Ours is but a small attempt in this direction. Obviously, the problems involved are much more complex than the simple analysis that has been presented, but our experience at the St. Louis plant indicates that the integration of off-the-job promotion with the forces of a sound in-plant accident prevention program offers an approach to safety that can produce results.

W. Platt Greer, sales representative in the Lima, Ohio, area for Universal Atlas Cement, retired recently, after almost half a century with the firm. He will continue as active secretary-treasurer of the Wapak Sand and Gravel Company and Central Concrete and Supply, Inc., Lima.

Charles R. Smith, Jr., has been named plant engineer at the newly completed Lime Kiln, Md., plant of Alpha Portland Cement Company.

Mr. Smith, who has been with Alpha Portland since 1954, began his association at the Birmingham plant. For the last two years he has been assistant superintendent at the Ironton plant.


HUDSON PULP & PAPER CORP.
MULTIWALL SACK
Guarantee
Effective . . . . . the Hudson Pulp & Paper Corp., 477 Madison Avenue, New York 22, New York warrants and guarantees to replace without cost in a future shipment or (at its option) to refund to the purchaser the cost of each and every Hudson Multiwall Sack which bursts, tears, splits, or otherwise fails in the course of packing and/or closing.
PULP & PAPER CORP.

Get USE from every bag you buy

Only HUDSON guarantees Multiwalls ...and puts it in writing

FIELD REPORT

TO: B.D.

Re: [redacted]'s Order

Herewith [redacted]'s carload order. Looks like beginning of good volume from this account. Their P.A. really opened up when I showed him our Written Guarantee policy. Explained to him that every Hudson bag he pays for is guaranteed to be a bag he can use. Or we pay!

He'd never known anything like this before. Please be sure to include validated Guarantee Certificate with your confirmation. Also give him full details on our Design Service. He's interested.

Hudson Bags increase your sales — cut your costs!

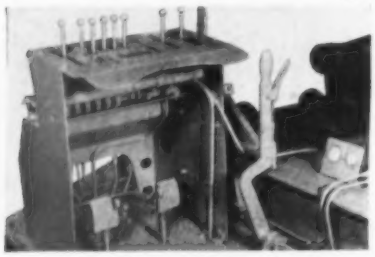
HUDSON MULTIWALLS

for further information write:

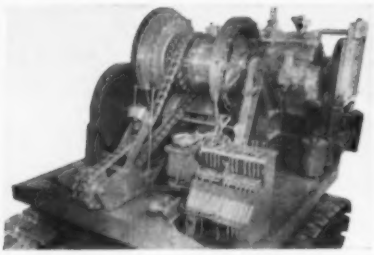
HUDSON PULP & PAPER CORP.
477 Madison Avenue • New York 22, N. Y.

Plants at Pine Bluff, Ark. • Palatka, Fla. • Wellsburg, W. Va.

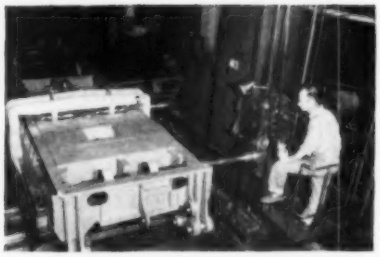
Six reasons why Link-Belt Speeder . . .



1. SPLIT-SECOND FINGERTIP CONTROL — Exclusive Speed-o-Matic power hydraulic controls put a K model through its paces at a flick of an operator's wrist . . . minimize fatigue . . . encourage high production throughout the shift.



2. BONUS USABLE HORSEPOWER — The extra strength built into load-carrying components permits K models to take full advantage of the engine's available horsepower and still remain well within engine manufacturers' recommended speeds.



3. PRECISION ALIGNMENT TO CUT MAINTENANCE — Close-tolerance machining, including jig line boring (above), means closer fits . . . less chance for eventual misalignment . . . no need for shims . . . better parts interchangeability.

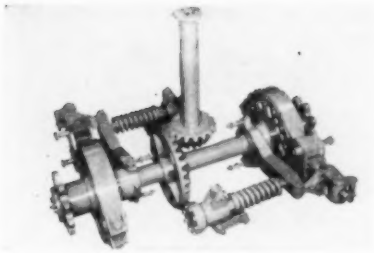
King-size K models

Here's how the 1¾-yard K-370 Series is tailored to today's economy . . . why it's a better buy than any 1½-yard shovel-crane . . . more practical to use than many 2-yard rigs

In comparison with 1½-yard machines, the 1¾-yard K-370 offers much more than just a 16% advantage in bucket capacity. It's fast, easier handling . . . exceptionally maneuverable and easy to transport. It boasts the top usable horsepower in its class . . . even outrates some 2-yard rigs.

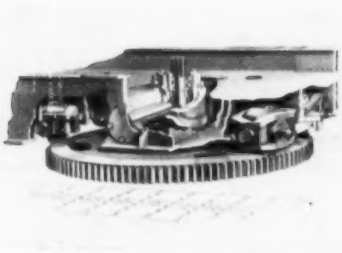
For the complete story, see your distributor or write for the new 20-page catalog, No. 2727.

LINK-BELT SPEEDER CORP., CEDAR RAPIDS, IA.



4. EXCEPTIONAL ON-THE-JOB MANEUVERABILITY—Traction mechanism features hydraulic power steer. This, plus high speed power shifting, makes K models great for work in tight quarters. No time wasted to manually engage jaw clutches.

5. EASY JOB-TO-JOB TRANSPORTABILITY—Any K model can be readied for lowboy or rail car transport in short order. Crawler side frames, counterweight and attachments can be removed to meet weight or width restrictions.



6. NO BINDING STRESSES ON CENTERPIN OR ROLLERS—Exclusive centerpin trunnion and oscillating conical roller design eliminates concentrated centerpin loadings . . . prevents shearing or bending . . . minimizes wear.

deliver bonus output

And here's why the 3-yard K-608 series outmaneuvers smaller rigs . . . often outproduces bigger machines

The K-608 has created real excitement wherever it has been used. It's so fast, so easy to handle, so powerful!

And no wonder—with Speed-o-Matic controls, power shift, power steer and many other features, the K-608 wheels through cycles at a speed you'd expect only from smaller rigs. The K-608 features an engine-torque converter and tailshaft output governor combination as standard equipment. The result—ability of engine power to adapt to load requirements . . . no chance for engine stalls.

For all the facts, see your distributor or write for the new 20-page catalog, No. 2710.

14,998

LINK-BELT SPEEDER

It's time to compare . . . with a Link-Belt Speeder

Enter 128 on card, page 123

Appointments and Promotions

Promotions of nine executives of the Universal Atlas Cement Company, division of United States Steel Corporation, have been announced.

FRANCIS A. HENNIGAN, assistant to vice-president, manufacturing, New York, has been appointed assistant chief industrial engineer, Operating, New York.

CARROL E. ALDRICH, former assistant plant manager, Duluth, Minn., has become plant manager at the same location.

ALFRED H. ZIMMERMAN, assistant plant manager, Independence, Kans., has been promoted to plant manager.

The former assistant plant manager at the Fairborn, Ohio, plant, ROBERT P. JARRETT, has been transferred to the Independence, Kans., plant in the same position.

JAMES E. JENKS, assistant plant manager, Universal, Pa., plant, was transferred to the Hudson, N. Y., plant, in the same capacity, succeeding PAUL E. PATTON, who was appointed assistant to plant manager, Hudson, N. Y.

WILLIAM F. BRAUN, plant engineer, Duluth, Minn., has been promoted to assistant plant manager at the same location.

Appointed assistant plant manager at Universal, Pa., was FLOYD DODSON, formerly chief chemist and inspector.

FRANK J. WEAVER, power foreman, Fairborn, Ohio, plant, received a promotion to assistant plant manager at the same plant.

The following appointments have been announced by the officers of Universal Atlas Cement Company: CHESTER D. RUGEN, assistant vice-president, engineering, New York, has become assistant to vice-president, manufacturing, in New York. W. OWEN LAWRENCE has taken the newly created position of assistant vice-president, engineering and research, New York. He was formerly assistant vice-president, operating, New York.

F. P. DIENER, former director, tests and research, New York, has been named director, research, New York.

J. PALMER CAMM, plant manager, Independence, Kans., has moved to New York to become general manager, operating, New York.

The manager of the Duluth, Minn., plant, ROALD W. NYGAARD, has become assistant general manager, operating, New York.

R. E. Balster

ROBERT E. BALSTER has been appointed Northwest public relations representative for Permanente Cement Company, Glacier Sand & Gravel Company, and Kaiser Gypsum Company, Incorporated.

Mr. Balster will have headquarters at Permanente's Seattle office. He will be responsible for the public relations activities of Permanente Cement Company and its subsidiaries in Washington, Oregon, and Alaska.

The appointment of WARREN G. BURRES to the position of district engineer of the Portland Cement Association's Los Angeles office was announced recently.

Mr. Burres has served as the Association's personnel training manager since January, 1957. He succeeds John M. McNerney, who was appointed manager of the Association's western regional office.

WALTER E. KUNZE JR., assistant manager of the P.C.A. Structural and Railways Bureau, will succeed Mr. Burres as manager of personnel training.

Mr. Burres joined the Association in 1952 as a railroad engineer in the Structural and Railways Bureau. Mr. Kunze has served as a structural engineer in the Structural and Railways Bureau since 1952, and was named assistant bureau manager in January, 1958.

DEAN L. SKAUGSTAD has been appointed sales representative for Hawkeye-Marquette Cement Company in southeastern Minnesota area. He replaces C. L. Mullen, who is retiring.

New Diatomaceous Earth Plant

(*From p.* 109)

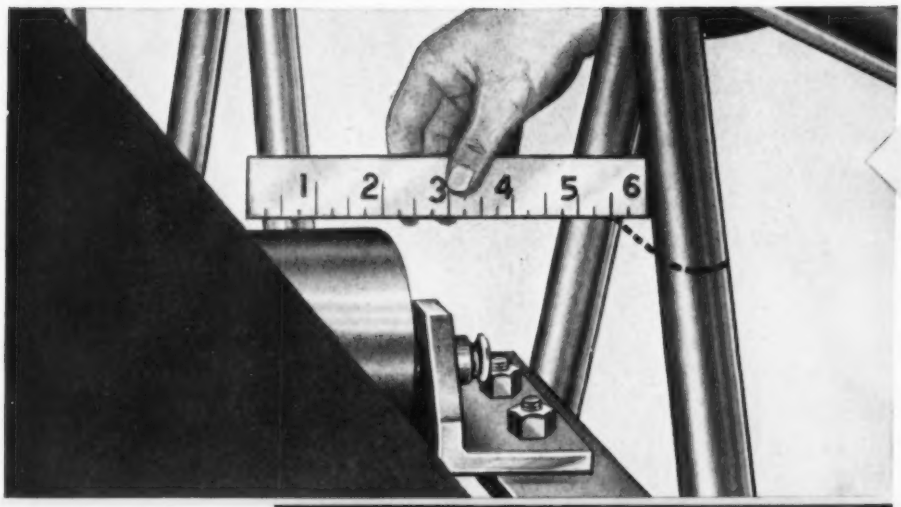
tom shells) are heated to the point at which they will fuse into a fritted product with characteristics comparable to that of whole diatoms in filter-aid material.

Finished products, natural or calcined, are conveyed to appropriate bins from which they are transferred to the packing department and subsequently to semi-automatic palletizing, prior to shipping. Waste products, *i.e.*, dust from the initial phases, and larger detritus from other steps in the flow, are slurried and pumped to waste ponds.

Since the fineness and lightness of the material processed poses problems in dust control, the collection system has been designed to be operated closed under normal conditions, with all dust returned to the system except that discharged to a wet collector. Negative pressures are established through most of the process to obviate the escape of dust to atmosphere. A special air supply, passed through electrostatic precipitation, is delivered to the area where the finished products are bagged.

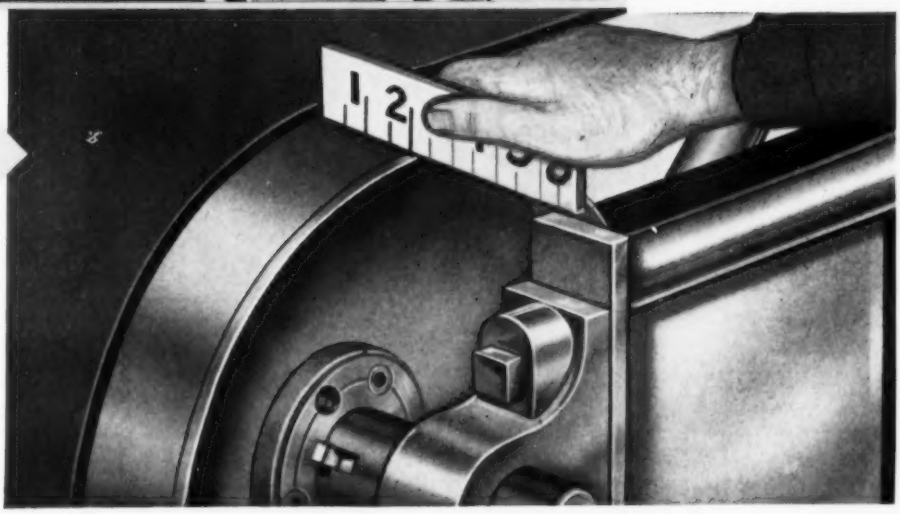
This latest addition to Eagle-Picher's diversified activities joins a complex that now incorporates 23 fabricating plants in the United States and Mexico, two diatomaceous earth operations in Nevada, plus lead and zinc operations in Missouri, Oklahoma, Kansas, Illinois, Wisconsin, and Mexico.

Sales of filter-aid products of the new plant will be handled by the firm's Celatom Products Department under the direction of Robert L. Shirley, national sales manager of the department, who maintains headquarters in Cincinnati. Production is headed by John W. Kenney Jr., general works manager of the Celatom department.



WIDER FRAME...
MARCO Tubular Frames are widest in the industry. They provide 100% more space (5½") in the critical area... between belt edge and nearest frame member. Pedestal type return idler brackets are used, instead of hanger brackets that confine and damage belt.

WIDER FACE PULLEYS...
MARCO is first with modern pulley specifications. 2" between belt and pulley edge...provides 100% greater protection than outmoded standards. Reduces possibility of belt destruction caused by "belt wandering" in high tension areas.



WHY RISK COSTLY, CONVEYOR BELT DAMAGE?

Only wider, MARCO Tubular Frame Conveyors provide maximum 'belt-edge' protection

Repairing or replacing conveyor belt represents the largest maintenance expense in a conveyor installation. To prolong belt life, MARCO conveyors are first to have all these belt-protecting features.

Wider Frame: Completely outmodes other conveyors that narrowly confine and damage belt should severe 'belt-wandering' occur.

Wider Face Pulleys: MARCO'S wider frame permits the use of modern, wider face pulleys to further protect belt from damage should 'belt-wandering' occur.

All Tubular Members: MARCO Tubular Frames are more rigid. Constructed of the strongest known structural member, these frames are modern ...and resist material and water build-up. Sharp 'belt-cutting' edges are eliminated with this exclusive construction.

Rigid Joint Construction: Another MARCO exclusive...4 bolts in each connection...16 in each joint. Not the usual 1 or 2 per connection. Joints are more rigid. Resists frame misalignment, simplifying belt training and increasing belt life.

If wind, uneven loading or other factors should cause 'belt-wandering'... with a MARCO frame you have the most complete protection possible against costly 'belt-edge' damage. This greater protection is yours at no greater cost.

MARCO'S Quality and Exclusive Features Mean More for Your Conveyor Dollar...

Remember, your conveyors are not mere plant accessories... they deserve the attention of a specialized manufacturer offering modern specifications, carefully and properly designed to meet your most exacting requirements. It will pay you to check MARCO quality, exclusive features and proven performance record before you buy.

For more information see your Marco distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

MARCO*

*Trademark Reg.

engineered MARCO products:

Tubular Frame Belt Conveyors Conveyor Idlers Solid and Self Cleaning Steel Pulleys
Bucket Elevators Control Gates Feeders Bins

DESIGNED FOR DIVIDENDS

take advantage of the extra profits in every operation with...

HENDRIX

DRAGLINE BUCKETS

Hendrix Lightweight DRAGLINE BUCKETS

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

TRACTION...

unequaled in any other truck

Six-wheel drive plus exclusive Balanced Bogie with Power Divider endow this Mack heavy-duty dumper with matchless traction over any surface that will support a truck.

Macks get in—and out—of spots where other trucks bog down. And especially this big, 65,000-lb. GVW Mack heavy-duty dumper—the Model B-8136SX.

Only Mack combines the six-wheel-drive feature with exclusive Balanced Bogie with Power Divider—the four-wheel, rear-axle drive that transmits the most power to the wheels having greatest traction.

Exclusive Mack front driving axle transmits power to the wheels through a single-reduction carrier and two pairs of spiral-bevel gears at the steering knuckles. Maximum ground clearance is thus attained and, being fully enclosed, the complete driving and steering mechanism is protected from dirt and water.

Exclusive Mack Thermodyne® diesel engine delivers up to 205 hp at 2100 rpm for long life and outstanding economy.

Exclusive Mack Duplex 10-speed heavy-duty transmission with integral transfer case turns engine power into steady pulling ability for year after year of dependable, repair-free life.

If next-to-impossible going is slowing down your operations, get full facts on this rugged, sure-footed Mack for arduous on-and-off highway service. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

MACK
FIRST NAME FOR
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Designed to
PERFORM BEST
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ERIEZ
permanent non-electric
MAGNETIC PULLEYS

Only Eriez — with its years of know-how based on solving magnetic problems of all types for industry — offers such a wide range of PERMANENT MAGNETIC PULLEYS to meet your specific needs. Remove tramp iron or iron fines efficiently, economically, *automatically!* Size for size, Eriez Pulleys provide two to three times greater magnetic fields than limited radial center air gap units. Magnetic strength unaffected by heat or cold. No "weak spots" . . . magnetic strength extends across entire Pulley face. Standard sizes range from 4" diameter thru 30" diameter and in many belt widths.

MAGNETIC STRENGTH GUARANTEED INDEFINITELY . . . NO OPERATING OR MAINTENANCE COSTS • EFFECTIVE FOR WET OR DRY MATERIALS • EASILY, QUICKLY INSTALLED • PROVED IN THOUSANDS OF APPLICATIONS IN EVERY TYPE OF INDUSTRY.

Be sure of getting the most effective unit for your exact needs. Contact us; we'll work closely with your engineers to provide peak performing magnetic equipment at the most economical cost to you.

WRITE TODAY FOR COMPLETE LITERATURE
Eriez Mfg. Co., 113-P Magnet Drive, Erie, Pa.

ERIEZ

Enter 134 on card, page 123

Legal Decisions

On Industry Problems

By LEO T. PARKER

Attorney at Law
Cincinnati, Ohio

Must Follow Rental Contract

If a lease contract provides that the lessee shall pay rental until he delivers rental equipment to the lessor, he must pay rentals strictly in accordance with the terms of the lease contract.

For instance, in *Rackliff v. Coronet Construction Company,* 321 Pac. (2d) 50, it was disclosed that one Rackliff leased two rubber-tired motor scrapers to the Coronet Construction Company. The lease contract stated that the Coronet Construction Company would pay rent on the equipment until the scrapers were returned to Rackliff.

The testimony showed that the Coronet Construction Company did not return the scrapers directly to Rackliff, but notified him that the scrapers were in a lot where he could get them, as the company would not need them any longer.

In subsequent litigation, the higher court held that the company must pay Rackliff the agreed rentals of $4,000 monthly to the date Rackliff got possession of the equipment. The court ordered the Coronet Construction Company to pay Rackliff $5,000, which included certain repair costs.

Bond Eliminates Materialman

All courts agree that a bonding company is liable solely on the contents of its bond. In other words, if a clause in the bond states that a subcontractor is liable solely to the general contractor, the bonding company cannot be compelled to pay a materialman for materials furnished to either the general contractor or the subcontractor.

For illustration, in *Hop Quarries v. Mutual Bonding Company,* 255 Fed. (2d) 147, it was shown that a bond was issued to a subcontractor containing a clause which implied that only the general contractor was protected by the bond.

The testimony showed that the Hop Quarries furnished crushed rock to a subcontractor who had furnished a payment bond to the prime contractor. This bond contained a clause to the effect that no person other than the prime contractor can bring any suit on the bond.

In view of this clause, the higher court held that the bonding company was not liable for payment for crushed rock furnished by the quarry company to the subcontractor.

Implied Warranty

Last month a higher court clearly held that a seller always is liable on an implied warranty that the materials he sells are free from defects and reasonably worth the purchase price. This rule of law is applicable although the seller gave no guarantee to the buyer as to the quality of fitness of the merchandise.

In *Spence v. Rivers Masonry Supply Company,* 90 N. W. (2d) 873, the testimony showed facts, as follows: a man named Spence purchased cinder blocks from a manufacturer. A few months after the residence was built many of the blocks started to crack, chip and to pit and explode into a popping series of minute craters, followed by numerous flakings and powdery deposits and exuding unsightly travelling red and yellow stains known as bleeding. Spence sued the manufacturer for damages and proved that the defects were not apparent to him when they were delivered. Proofs were also offered that the manufacturer failed to test and examine the materials adequately that went into the blocks or to inspect or test properly the completed blocks.

The counsel for the manufacturer argued that the latter could not be held liable because there was no guarantee given on the quality of the blocks and that the manufacturer was not negligent in the manufacture of the blocks.

Nevertheless, the higher court indicated that the manufacturer was liable in several hundred dollars damages to Spence, and stated important law, as follows:

"The implied warranty reaching from the manufacturer to the ultimate purchaser is in the nature of a representation that the highest degree of care has been exercised, and a breach of such duty inflicting personal injury is a wrong. Except in name and to establish privity between the manufacturer and the ultimate consumer, it is the same thing as negligence. In this case it appears that there was a lack of due care."

This higher court went on to explain that in order to recover damages for an injury from merchandise purchased, a buyer may rely upon either negligence or upon an implied warranty.

General Lease Does Not Include Gravel

Here is a question frequently asked: "If the owner of land signs a general lease, can the lessee remove sand and gravel from the land?"

According to a late higher court decision, the answer is in the negative.

For example, in *Winsett v. Watson,* 206 S. W. (2d) 656, the testimony showed that one King obtained a lease which contained a clause to the effect that King had the right to the land for oil, gas, and "other minerals," and removing the same therefrom.

In subsequent litigation, the higher court held that the lessee could not take sand and gravel from the land, saying:

"The precise question before us is whether a conveyance of oil, gas, and 'other minerals' includes sand and gravel . . . We believe the conveyance or reservation does not include gravel."

Boundary Lines on Stream

Recently a higher court answered several important legal questions

NEWS ABOUT THE DUMP BODY BUSINESS

Performance Bonus!

MARION BODIES AND HOISTS

Six Marions Provide Big Daily Payloads On Double-Duty Fill Dirt-Coal Hauling Jobs

Since May, 1958, six Marion 13 cubic yard bodies have been performing double-duty for Frank Murphy Trucking of Zanesville, Ohio. On days when the weather prevented hauling dirt for building an overpass on highway 16 in Newark, Ohio, the units were kept busy hauling coal.

The owner, Frank Murphy, has been well pleased with the continuous operating dependability and efficiency of the units during these nine months. On the road building job, each truck has maintained a high daily payload rate of 450 yards of dirt during each 10-hour shift. Each unit makes 40 to 50 of the 1½-mile round trips a day. The Marions are loaded in 30 to 40 seconds with a grader-conveyor.

The 13 cubic yard bodies are raised with a Marion front telescopic hoist Model LF-614-T-120.

Get all the facts on Marion bodies and hoists for construction . . . quarrying . . . mining . . . all your hauling requirements.

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Marion, Ohio, U.S.A.

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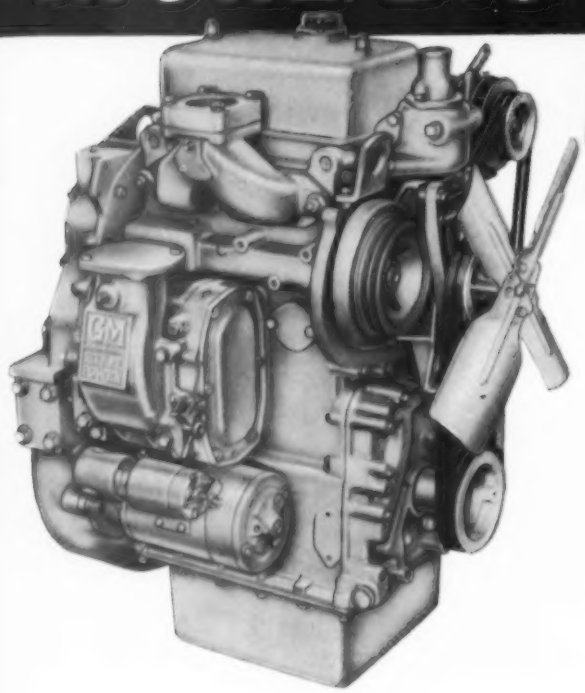
MORE BIG NEWS FROM



Now a *DIESEL* Engine for JOHN DEERE 440 TRACTORS

Bringing you every DIESEL advantage PLUS 10% MORE POWER

Here, power-matched to John Deere "440" Crawlers and Wheel Tractors, is a modern Diesel power plant that means even greater savings for you on time and fuel. Equipped with this famous "Jimmy" Diesel engine, John Deere "440" Tractors not only provide *more* power—10 per cent more than previous tractors in the line—they also give you the *faster* response of high-compression, high-torque Diesel performance.

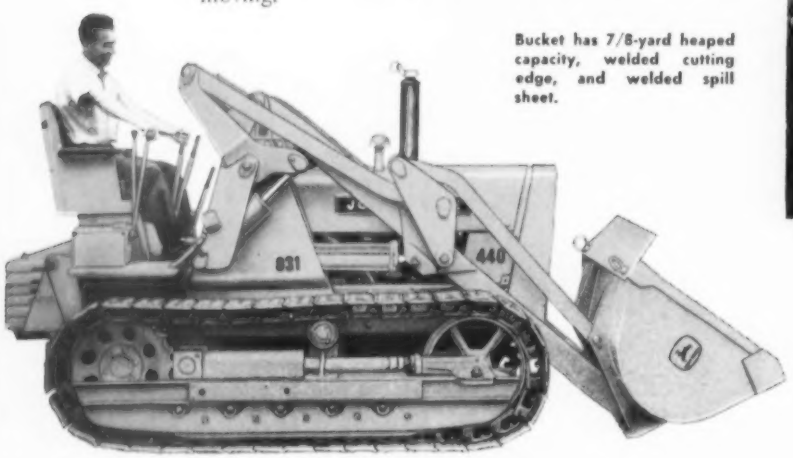
In addition, the "fire insurance" of Diesel fuel opens up new construction and materials-handling jobs to the John Deere "440" in mines, dockyards, and other confined areas.

Whatever your reasons for preferring Diesel power, act now—cash in on modern Diesel advantages with a John Deere "440" Crawler or Wheel Tractor and matched working equipment.

A *New* answer to speedy, low-cost loading... THE JOHN DEERE 831 LOADER

Take your choice of John Deere gasoline or Diesel power, but pick the new John Deere 831 Loader for a *new low* in earth-moving costs! Rugged construction, plus the husky hydraulic system of the "440," provides extra pry-out pressure and lifting ability that greatly increase daily work capacity.

Check into the new John Deere 831 Crawler-Loader now—start setting new records for low-cost earth moving.



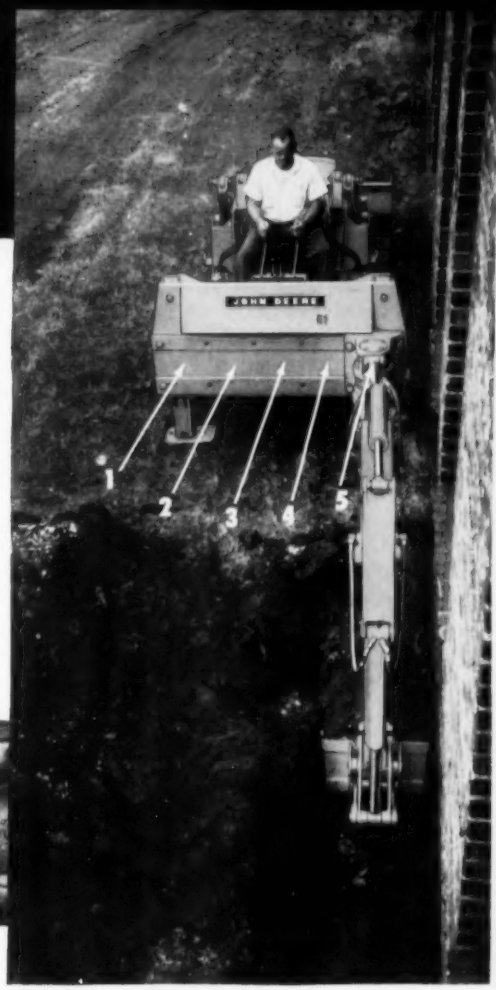
Bucket has 7/8-yard heaped capacity, welded cutting edge, and welded spill sheet.

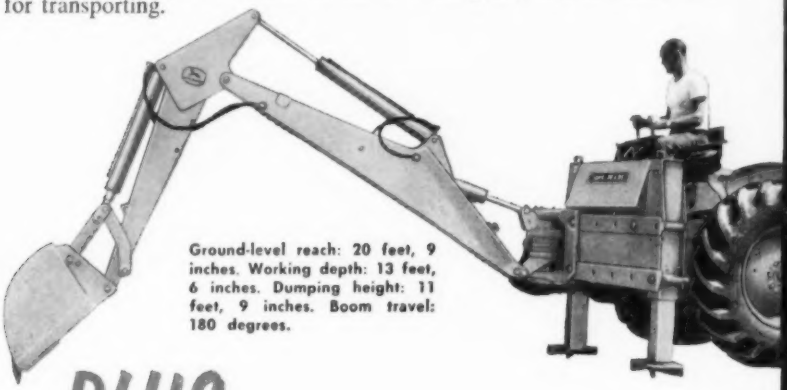
When bucket is dumped from full-height position, it returns to the ideal 9-degree digging angle by use of the boom control only.

JOHN DEERE

Introducing the FIRST 5-POSITION BACKHOE in the Field... THE *New* JOHN DEERE No. 51

One man with a wrench can set the boom on this John Deere 51 Backhoe in any of five mounting positions—in 15 minutes or less. End position at right or left speeds flush-digging along buildings. End mounted, the hoe folds against tractor to make a compact, well-balanced unit for transporting.

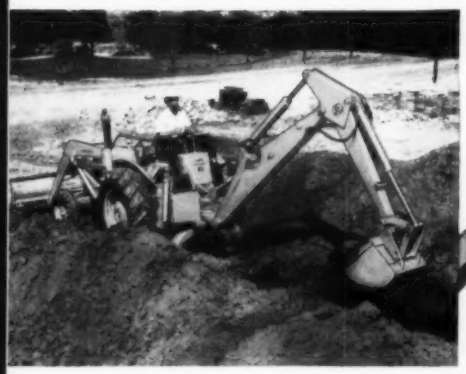


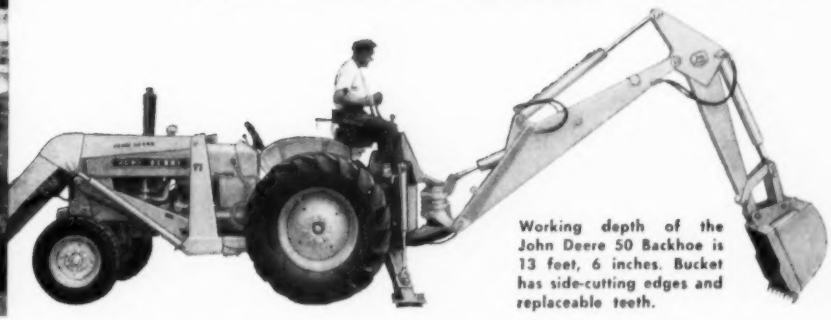


Ground-level reach: 20 feet, 9 inches. Working depth: 13 feet, 6 inches. Dumping height: 11 feet, 9 inches. Boom travel: 180 degrees.

PLUS

...a brand *New* center-position BACKHOE... THE JOHN DEERE No. 50





Working depth of the John Deere 50 Backhoe is 13 feet, 6 inches. Bucket has side-cutting edges and replaceable teeth.

Here's reach and power to tackle any trenching job! Center-mounted boom has a 20-foot, 3-inch reach at ground level, swings smoothly through a 205-degree arc by hydraulic power. Two control levers do the job, while operator sits in comfort. Same hydraulic system that operates backhoe also powers loader.

JOHN DEERE Industrial Tractors and Equipment

Completely Engineered for Industry

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Please send free information on ☐ "440" Diesel Crawlers ☐ "440" Diesel Wheel Tractors ☐ 831 Loader ☐ 50 Backhoe ☐ 51 Backhoe.

Name _____

Firm _____

Address _____

City _____

State _____

Enter 136 on card, page 123

having special interest to a majority of readers of PIT & QUARRY, with regard to riparian ownership of land on streams.

For example, in *American Sand Company v. Dreyer Sand Company*, 327 Pac. (2d) 1031, the higher court held:

"The extent of title of owner of lands bordering upon streams and navigable waters depends upon the local law."

A riparian owner owns only to the bank, and not to the center of a navigable stream.

The boundary line between the riparian owner and a state's navigable river bed is the line to which the water rises in time of ordinary high water.

In this case the higher court held that since a company had a valid lease from the state to operate and maintain sand pumping equipment in a navigable stream, the company was entitled to use of the river bed and the channel to the ordinary high-water mark for the operation and maintenance of its equipment. The court went on to explain that where lands were originally surveyed under the laws of the United States, the lines run by the United States surveyors along the river banks are not lines of boundary. The owners of the adjacent lands own at least to the water's edge, thus giving them the benefit of the river frontage, with the right to access to the river. The true boundary line of a navigable stream or lake is the point to which the water usually rises in ordinary seasons of high water.

What Is Occupational Disease?

Last month a higher court held that an occupational disease is an infection which arises naturally and proximately out of extra hazardous employment. If past experiences indicate that an employee sustained an occupational disease at his regular work, he can recover state compensation.

For example, in *Nygaard v. Department of Labor and Industries of the state of Washington*, 321 Pac. (2d) 257, the testimony proved that an employee collapsed while at work. He filed his claim of compensation with the department of labor for disability as a result of an occupational disease, caused by exposure to dust, from his sanding job.

The lower court rejected his claim but the higher court reversed the verdict on evidence that the employee had worked at extra hazardous employment for 9 years before he collapsed. This court said:

"For a number of years, claimant's work required him to operate a belt sander that produced considerable dust. The shop in which he worked was quite dusty at times. From 1944 until his collapse in 1953, claimant was treated on many occasions by doctors for his existing condition."

Tax Imports

An official of a large supply corporation recently asked whether or not a state may tax nonmetallic materials imported from a foreign country.

Here is the law: A relatively new United States statute clearly provides that no state, county or city shall tax goods, materials or merchandise imported from a foreign country and left in the original package. The instant a package is broken, however, the contents are taxable.

For illustration, in *E. J. Stanton v. Los Angeles*, 177 Pac. (2d) 804, it was shown that a corporation imported from a foreign country certain merchandise and sold it at wholesale and retail. The testimony showed that after a shipment was received, the materials were placed in a storage warehouse. From time to time sales were made from the materials in the warehouse.

Under these circumstances, since the materials and merchandise was not allowed to remain in the original packages, the higher court held that the county in which the materials were located could tax same.

For comparison, see *Gardner-Richardson Company v. Evatt*, 61 N. E. (2d) 704. Here it was shown that state authorities taxed imported merchandise which was left in the original package.

The higher court held that the goods were imports exempt from state taxation.

? *When in Doubt* ?

specify the Job-Tested Scale

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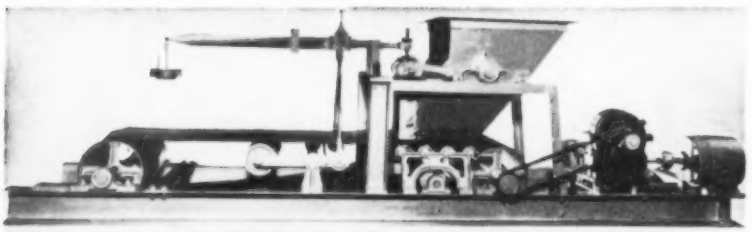

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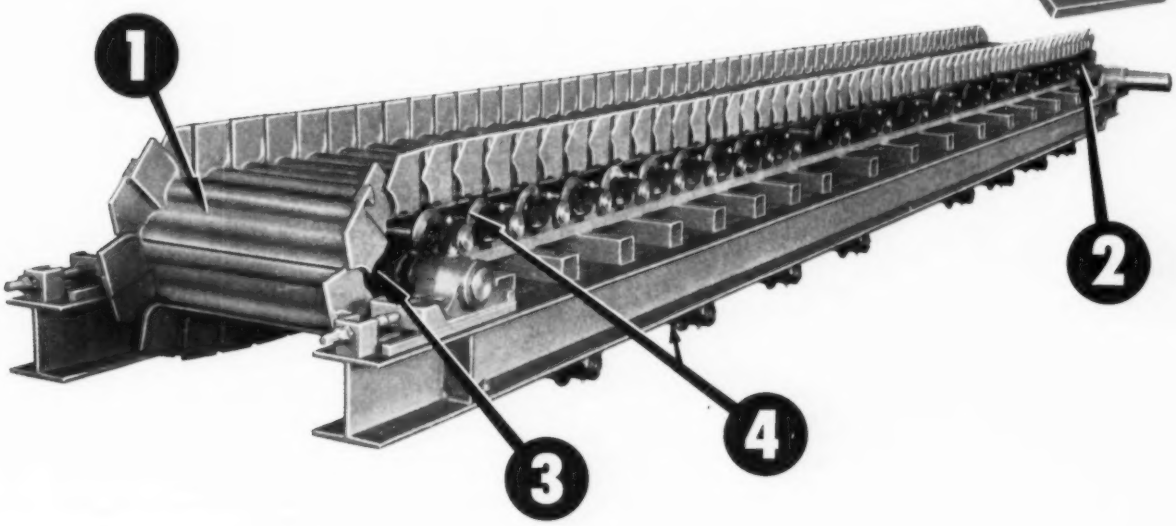

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Picture tons of heavy, abrasive material smashing down on this TAYLOR-WHARTON Pan Feeder, month after month without a breakdown. The reason — tough TISCO Manganese Steel soaks up shock and abrasion, keeps production climbing, maintenance down. For further information write to:

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Consignee Is Liable

A reader inquired recently, "If a consignor fails to pay lawful freight charges, can the carrier collect due charges? If so, who is liable?"

In *Atlantic Coast Line Railway Company v. Wannamaker Company, Inc.*, 57 S. E. (2d) 311, it was shown that a car of materials was consigned to a consignor. The carrier's agent incorrectly told the consignee that all freight charges had been paid. Later the carrier discovered this error and sued the consignee for $212.99 due freight.

The higher court held that the consignee must pay the freight charges, and said:

"If the carrier charges and receives only a part of the lawful tariff on a shipment, and the shipper or consignee pays the same in good faith, the carrier is not thereby estopped from collecting the full amount from any party legally liable therefor. The federal law makes the consignee accepting a shipment liable for the tariff charges."

Also, see *Western v. Underwood*, 281 F. 891. This higher court held that although a common carrier signs a written contract to transport merchandise at rates less than fixed by lawful tariffs, yet the carrier may sue the consignee and collect the full tariff rates, notwithstanding the fact that the carrier has been transporting merchandise at the lower rates for several years.

Still Available.....

THE NEW

PORTLAND CEMENT PLANT MAP

Limited quantities of Pit and Quarry's new Portland Cement Plant Map are still available.

It is 34 inches high by 40 inches wide and printed on sturdy 60 pound stock, making it ideal for hanging on an office wall or placing under the glass top of your desk. Each producing plant is listed alphabetically, by state and city. This list covers the plants in the United States, Canada, Mexico, Cuba and Puerto Rico. These plants are also indicated on the geographical map. Also included in the information on each plant is the plant's producing capacity at the end of 1957, and its estimated capacity at the end of 1958, if the plant was planning to expand; the process used to manufacture each plant's cement . . . wet or dry; and the brand names of the cement each plant produces. New plants under construction and grinding plants also appear in this group.

In addition, portland cement distributing plants located in the United States, Canada, Mexico, Cuba and Puerto Rico appear in a separate list and are also shown on the geographical map.

These maps may be purchased for the following quantity prices:

NUMBER OF MAPS	PRICE
1 — 10	$1.00 each
11 — 25	.75 "
over 25	.50 "

Just tell us the number of maps you want by submitting your request on your regular company letterhead. You can either send along your check or request to be billed later; either way is suitable to us.

Pit & Quarry Publications

431 S. Dearborn St. Chicago 5, Ill.

What Is Mining?

The operator of a large quarry recently asked: "Can I be assured that extraction of rock from the ground is a mining operation within the scope of state laws, which exempts operators of mines from taxation?"

Recently, I located a leading higher court decision which held that while the term mining originally conveyed the idea of extracting minerals from the earth by means of tunneling and shafting, yet in our modern times it has assumed a broader signification. In other words, mining is not now limited to the method of excavation, but includes open workings and quarries. Therefore, the word "mining" now includes all substances which are classified geologically as minerals, and ordinarily includes placer mining.

See *Burdick v. Dillon*, 144 F. 737, 741. This higher court held that the word "mining" includes quarrying.

Also, see *Union Drainage Dist. No. 6 of Towns of Bourbonnais and Menteno v. Manteno Limestone Company*, 93 N. E. (2d) 500. This late court held that the term "mining" includes the quarrying of limestone.

Transit Mixers Not Exempt

An operator of a concrete plant asked this interesting legal question: "In states where no sales or use tax is required to be paid on machinery used directly to produce salable merchandise, are motor truck concrete mixers exempt from taxation?"

A new higher court decision answers this question in the negative.

For example, in *W. F. Anderson & Sons Company v. Glander*, 97 N. E. (2d) 29, it was shown a state law exempts from sales and use taxation all things which are used

directly in the production of merchandise and materials.

The testimony showed that a company is engaged in the business of processing and selling concrete, by a method usually called transit mix, wherein the necessary ingredients for producing concrete are placed in a metal mixer at the plant. This mixer is mounted onto a motor truck chassis, and the mixing of the concrete occurs during the time the mixer and its contents are being transported to the location where the concrete is to be delivered and utilized.

The counsel for the company contended that as the state does not tax stationary concrete mixers these motor trucks and chassis are exempt from taxation. The higher court refused to agree, saying:

"To our way of thinking there is no sound basis for sustaining the appellant's (company's) rather ingenious contention . . . that such chassis in fact are mobile bases for the concrete mixers and that since the purchases of stationary mixers are not taxed, discrimination has been practiced against appellant (company) in the assessment of sales and use taxes on the purchase of these motor truck chassis which serve the same purpose."

Suit for Treble Damages

A higher court has held that a land owner may recover treble damages from any person or corporation which practices monopolistic acts in violation of the Federal Anti-trust laws.

For illustration, in *Sandidge v. Rogers*, 256 Fed. Rep. (2d) 269, the testimony showed that one Sandidge leased her real property to a corporation engaged in the business of quarrying stone. In a later suit she alleged that her royalties from the corporation were satisfactory until one Rogers engaged in a plot, plan and conspiracy in restraint of trade and to establish a monopoly of the stone business by acquiring control of land in which commercial grades of stone were located. She sued Rogers for treble damages under the anti-trust laws.

The higher court held that Sandidge may be awarded a favorable verdict for three times the amount of damages she suffers if she proves that her allegations are true.

Pneumatic Hammers Damage Building

A few weeks ago a higher court held that a contractor is liable who fails to protect nearby buildings against vibrations set up by pneumatic hammers. And although the city for which the contractor is doing work is immune to damages, the contractor remains personally liable.

For instance, in *Acton Manufacturing Company v. George M. Myers*, 320 Pac. (2d) 841, the testimony showed these facts: A contractor when performing construction work on a street, curbing and sidewalk used pneumatic hammers powered by air compressed at high pressure immediately adjacent to a three story building. The owner of the building sued the contractor alleging that the vibrations set up by the pneumatic hammers caused separation of the walls and cracks in the building.

The contractor attempted to avoid liability by proving that he was doing the work for the city which

Superior Crushing Capacity With Much Less Investment

Cutaway of 3-foot Tornado showing 20" disc

TORNADO IMPACT CRUSHER

- **Explodes gravel, sand, ores, coals, chemicals, abrasives into highest grade CUBICAL FORM (maximum feed size 6").**
- **Exclusive SQUARE IMPACT operation assures fine aggregate without hammers, gears, grates.**
- **Easier to transport and install due to light weight (2 tons). NO MASSIVE FOUNDATION NEEDED.**
- **Extremely low maintenance cost compared to other impact crushers. LOWEST POWER CONSUMPTION.**
- **"Hook-in" wearing parts replace in minimum time . . . 30 minutes. LESS DOWN TIME. (See inset right)**

● Most Tornado installations increase capacity with 4 to 10 times less investment! Crush 25-60 tons per hour with 3' or 70-100 tons with 4½' Tornado. High speed, spinning impeller throws material to smash squarely against breaker plates. Crushed product drops to take-off system. All crushers single stage with 20" and 27" discs. Single exception is 3' 3-stage recommended only for non-abrasive material with large percentage of fines required.

FREE Screen Analysis

Just send 50 to 75 lb. sample with your required specifications for finished product. After processing in test crusher, we'll return small sample of finished product with a screen analysis and our recommendations.

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STURDY CONSTRUCTION,

mean savings down the line with

TABLE 1

Belt width, inches	Capacity in tons per hour at belt speed of 100 FPM			Maximum lump size, inches		Maximum recommended belt speed, FPM	
	Wt. of material, lbs. per cu. ft.			Sized	Unsized	Half max. size lumps	Max. size lumps
	50	75	100				
18	27	40.5	54	3	5	400	300
24	50	75.0	100	4-1/2	8	500	400
30	81	121.5	162	7	10	600	450
36	117	176.0	235	8	12	650	500

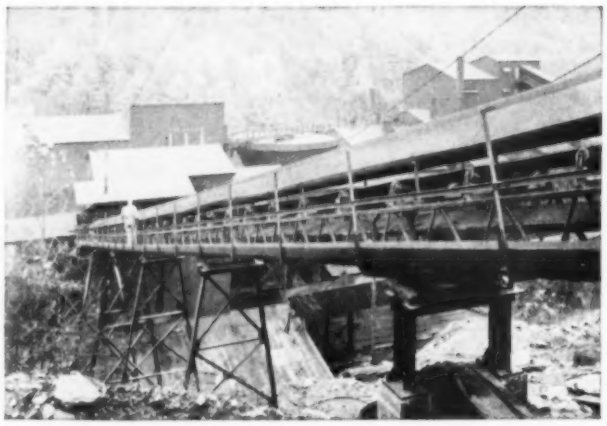
TABLE 2.

Weight of material, lbs. per cu. ft.	Belt width, inches	Capacity, tons per hour											
		Belt speed, feet per minute											
		100	150	200	250	300	350	400	450	500	550	600	650
50	18	27	40	54	67	81	94	108					
	24	50	75	100	125	150	175	200	225	250			
	30	81	121	162	202	243	283	324	364	405	445	486	
	36	117	176	235	293	352	411	470	528	587	645	704	763
75	18	40	60	80	100	121	141	162					
	24	75	112	150	187	225	262	300	337	375			
	30	121	181	242	302	363	424	486	545	605	665	726	
	36	176	264	352	440	528	616	705	792	880	968	1056	1144
100	18	54	81	108	135	162	189	216					
	24	100	150	200	250	300	350	400	450	500			
	30	162	243	324	405	486	567	648	729	810	891	972	
	36	235	352	470	587	705	822	940	1057	1175	1292	1410	1527

For applications handling materials weighing more than 100 pounds per cubic foot, or extremely abrasive material, refer problem to plant engineers for proper recommendations, belt and idler selection, etc.

THESE pre-engineered selection tables are your head start to savings with Link-Belt PRE-BILT sectional belt conveyors. In ordering, in estimating, in purchasing and other steps as well—comparable cost shortcuts add up to substantial savings. And rugged design throughout keeps maintenance costs down even under severe operating conditions.

For complete facts and application data on Link-Belt PRE-BILT conveyors up to 36-in. wide—with drives up to 40 hp and 24 or 42-in. truss depths, contact your nearby Link-Belt office.



This installation is typical of the exceptionally rugged construction and versatile application of **Link-Belt PRE-BILT belt conveyors.**

NO DETAILED DRAWINGS — From standardized data, a Link-Belt engineer will prepare an "on-the-site" quotation covering the components for your needs.

LOWER PURCHASING COSTS — Interchangeability and standardization lower costs and speed selection of parts . . . all available from Link-Belt.

STANDARDIZED SELECTION...

Link-Belt PRE-BILT sectional belt conveyors

TABLE 3. Horsepower to drive empty conveyor.

Belt Width Inches	Horsepower to drive empty conveyor for each 100 FPM belt speed											
	Conveyor centers, feet											
	50	100	150	200	300	400	500	600	700	800	900	1000
18	.20	.30	.35	.40	.50	.60	.70	.80	.90	.95	1.00	1.20
24	.30	.40	.50	.60	.70	.85	1.00	1.20	1.40	1.50	1.60	1.70
30	.40	.50	.70	.85	.95	1.10	1.30	1.50	1.70	1.90	2.10	2.30
36	.50	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	3.00

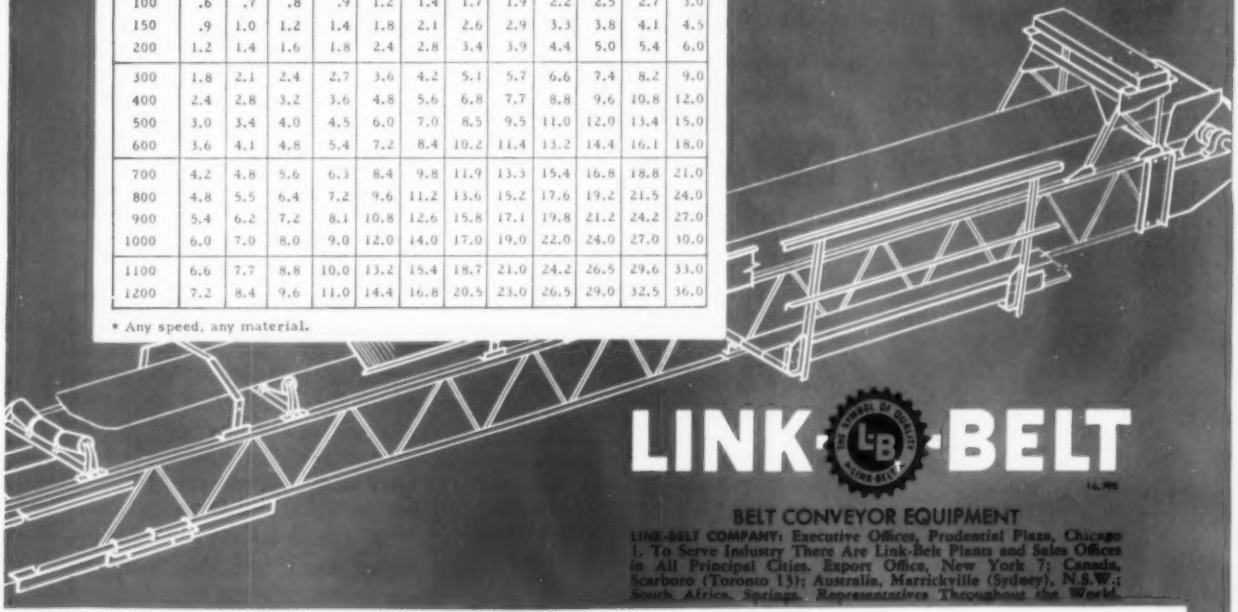
TABLE 4. Horsepower to convey material horizontally.

Tons per hour	Horsepower to convey material horizontally*											
	Conveyor centers, feet											
	50	100	130	200	300	400	500	600	700	800	900	1000
50	.3	.4	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.4	1.6
100	.6	.7	.8	.9	1.2	1.4	1.7	1.9	2.2	2.5	2.7	3.0
150	.9	1.0	1.2	1.4	1.8	2.1	2.6	2.9	3.3	3.8	4.1	4.5
200	1.2	1.4	1.6	1.8	2.4	2.8	3.4	3.9	4.4	5.0	5.4	6.0
300	1.8	2.1	2.4	2.7	3.6	4.2	5.1	5.7	6.6	7.4	8.2	9.0
400	2.4	2.8	3.2	3.6	4.8	5.6	6.8	7.7	8.8	9.6	10.8	12.0
500	3.0	3.4	4.0	4.5	6.0	7.0	8.5	9.5	11.0	12.0	13.4	15.0
600	3.6	4.1	4.8	5.4	7.2	8.4	10.2	11.4	13.2	14.4	16.1	18.0
700	4.2	4.8	5.6	6.3	8.4	9.8	11.9	13.3	15.4	16.8	18.8	21.0
800	4.8	5.5	6.4	7.2	9.6	11.2	13.6	15.2	17.6	19.2	21.5	24.0
900	5.4	6.2	7.2	8.1	10.8	12.6	15.8	17.1	19.8	21.2	24.2	27.0
1000	6.0	7.0	8.0	9.0	12.0	14.0	17.0	19.0	22.0	24.0	27.0	30.0
1100	6.6	7.7	8.8	10.0	13.2	15.4	18.7	21.0	24.2	26.5	29.6	33.0
1200	7.2	8.4	9.6	11.0	14.4	16.8	20.5	23.0	26.5	29.0	32.5	36.0

* Any speed, any material.

TABLE 5. Horsepower to elevate material

Tons per hour	Horsepower to elevate material									
	Lift, in feet									
	10	20	30	40	50	60	70	80	90	100
50	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.6	5.1
100	1.0	2.0	3.0	4.0	5.1	6.1	7.1	8.1	9.1	10.1
150	1.5	3.0	4.5	6.1	7.6	9.1	10.6	12.1	13.7	15.2
200	2.0	4.0	6.1	8.1	10.1	12.1	14.2	16.2	18.1	20.0
300	3.0	6.1	9.1	12.1	15.2	18.2	21.1	24.0	27.0	30.0
400	4.0	8.1	12.1	16.2	20.0	24.0	28.0	32.0	36.0	40.0
500	5.1	10.1	15.2	20.0	25.0	30.0	35.0	40.0		
600	6.1	12.1	18.2	24.0	30.0	36.0				
700	7.1	14.1	21.0	28.0	35.0					
800	8.1	16.2	24.0	32.0	40.0					
900	9.1	18.2	27.0	36.0						
1000	10.1	20.0	30.0	40.0						
1100	11.1	22.0	33.0							
1200	12.1	24.0	36.0							



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QUICK-LOW COST INSTALLATION — Simple construction and shop-assembled components facilitate field assembly and installation by your own or Link-Belt erectors.

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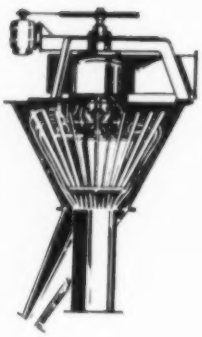

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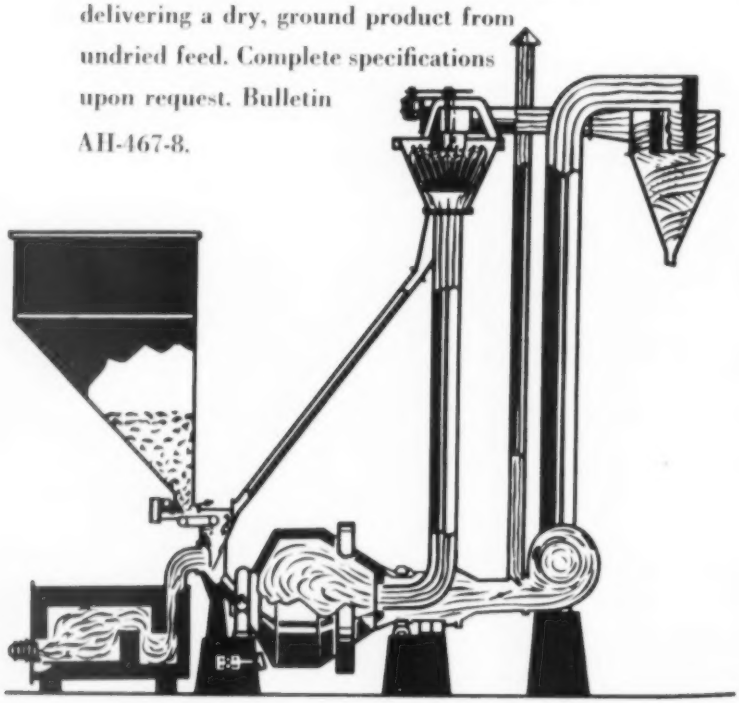
The Hardinge Gyrotor Classifier system, combined with a Hardinge grinding mill is an integrated grinding, classifying and product conveying system. Also available with an air-heating furnace for delivering a dry, ground product from undried feed. Complete specifications upon request. Bulletin AH-467-8.



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is immune to damages caused owners of real property when maintaining its streets. The higher court refused to agree with the contractor, saying:

"The defendant (contractor) was actually committing the acts complained of and was using the pneumatic machinery powered by air compressed at high pressure immediately adjacent to plaintiff's three story building setting up vibrations in the foundation, walls and floors thereof. The defendant's (contractor's) contention that as an independent contractor he shares the immunity of the city in maintaining its streets is of no merit because in this case negligence has been sufficiently alleged."

Contractor Pays for Negligence

Last month a higher court rendered a decision which proves that a prime or general contractor should be certain that money paid to his subcontractor for merchandise will be used by the subcontractor to pay off materialmen and laborers.

For illustration, in *Hopper Bros. v. Peerless Casualty Company*, 255 Fed. (2d) 137, the testimony showed facts, as follows: A suit was filed under the Miller Act against a prime contractor to recover $10,000.02 for 6,014.2 tons of crushed rock supplied to the subcontractor by the Hopper Brothers Quarries.

The testimony further showed that the prime contractor, thirty days after the last material was received on the work, settled with the subcontractor and paid him in full without inquiring of him whether he had paid the Hopper Brothers Quarries for the material he used on the work.

In subsequent litigation, the higher court held that under the circumstances either the prime contractor or the latter's bonding company must pay the amount still due the Hopper Brothers Quarries.

Gypsum, Lime & Alabastine, Canada, Ltd., has begun production of pulverized limestone in a new $350,000 plant which has been added to other operations at Beachville, Ont. Production is expected to reach full capacity of 30 t.p.h. early this year.

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Dragline loads sand and gravel, dredged from the Allegheny River, into 11-ton D Tournapull Rear-Dump at Tionesta, Pa. Tionesta Sand and Gravel Co. used the material to produce fine and coarse aggregate for making concrete. Narrow causeway was gradually built up by dragline as it moved down the middle of the broad river.

Haul dredged river gravel over narrow, mid-river causeway

Sand and rocky gravel, to be used as aggregate in making concrete, is dredged from the middle of the Allegheny River by Tionesta Sand and Gravel Co., Tionesta, Pa.

Aggregate materials are loaded with a 1-yd. dragline . . . hauled out over a narrow causeway built by the dragline as it moves down the river. One LeTourneau-Westinghouse D Tournapull® with 11-ton Rear-Dump, and five 5-ton dump trucks are used to haul this material 1000′ to the screening plant.

Round-trip cycle of 2000′ over loose gravel haul road was completed in 9.42 min. Tournapull hauler made 5.3 trips per 50-min. hour, carrying 8½ yds. per trip, for a total of 45 yds. per hour . . . compared to 26 yds. per hour for each truck.

"Easier to get around than trucks"

Important time-saver on this job was Rear-Dump's 90° turn-ability . . . enabling operators to turn machines around safely on narrow causeway. Operator Keith Adams said, "I like the Rear-Dump's steering gear best . . . easier to get around than trucks."

It will pay you to investigate L-W Tournapull Rear-Dumps. They're top production go-anywhere haulers that work profitably everywhere. Available in 3 sizes to fit your particular jobs: 11, 22, and 35-ton models. Write for full details.

*Trademark DR-1721-QJ-1

At Tionesta plant grizzly, sand and gravel spills into screening plant from D 'Pull' Rear-Dump. With sensitive, instant-response electric hoist, bowl can be lifted for full, instant dump . . . or controlled at a reduced angle for slow, precision feeding.

"D" Rear-Dump hauls heaped load of gravel along rocky mid-river causeway, enroute to screening plant. Average 2000′ round trip was made by machine in 9.42 min.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Manufacturers' News

Worthington Corporation, Harrison, N. J., announces the appointment of Bramil Pump & Supply Company, a division of John R. Bradshaw, Inc., Keene, N. H., to handle the distribution of the Worthington *Blue Brute* contractors' pump line throughout the state of New Hampshire.

The establishment of Cummins Diesel International Ltd. for the promotion of sales and service of Cummins diesel engines in international markets was announced recently by officials of the Cummins Engine Company, Inc., Columbus, Ind.

Cummins Diesel International Ltd. is headquartered in Nassau, The Bahama Islands, with additional offices soon to be opened in Europe and South America.

The appointment of DAVID J. DAVIS as director of sales and advertising of Gar Wood Industries, Inc., Wayne, Mich., has been announced.

Mr. Davis has served in many sales capacities since joining the Buckeye Traction Ditcher Company in 1940, and came with Gar Wood when the latter acquired Buckeye in 1946. Previously he has held the positions of Eastern District sales manager, tractor equipment sales manager, and most recently as general sales manager, construction machinery.

THOMAS W. BINFORD, president of the D-A Lubricant Company, Inc., Indianapolis, Ind., has been elected to the board of directors of the National Lubricating Grease Institute for 1958-59.

A. Goldberg

D. L. F. Wilson

ABE GOLDBERG, associated with Allis-Chalmers' processing machinery department for the last 55 years, has retired. For the last six months Mr. Goldberg had been a consultant in the processing machinery department. Prior to that, he was engineer-in-charge of renewal parts.

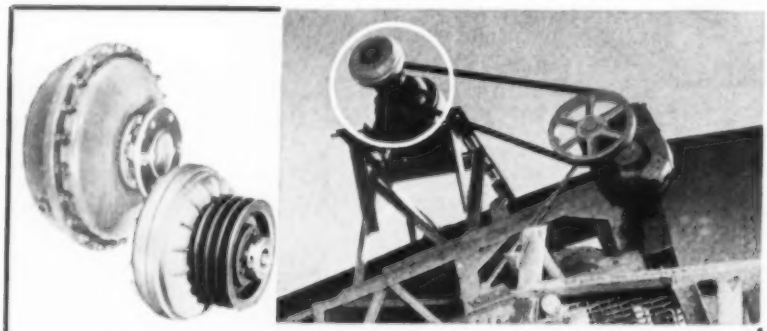
DAVID L. F. WILSON has been appointed engineer-in-charge of renewal parts in the firm's processing machinery department. He joined Allis-Chalmers in 1947 and for several years served as a sales representative in the firm's Chicago district.

GENE A. FUHRMAN has been promoted to manager of the Philadelphia division of The General Tire & Rubber Company, Akron, Ohio. He replaces RICHARD GRAYBILL, who has been transferred to manufacturer's sales.

Mr. Fuhrman will direct sales of replacement tire sales in portions of Pennsylvania, Connecticut, Delaware, Maryland, New Jersey, New York, and in Washington, D. C.

Dorr-Oliver Incorporated, Stamford, Conn., has moved its filtration engineering and development operations from Oakland, Calif., to Stamford. As a result of this move, all the engineering and manufacturing of equipment relating to filtration are centralized in the east.

The move also completes consolidation in Stamford of Dorr-Oliver engineering and development operations on all but semi-mass produced units. Engineering and manufacture of these units, such as cyclones, centrifuges, and pumps, will continue to be carried out at the Oakland facility, which is being built up as a headquarters for this type of operation.



Stop conveyor downtime!
Cut operating costs!

Twin Disc Fluid Couplings and HYDRO-SHEAVE® Drives cushion out destructive vibrations and shocks caused by sudden loads and jamming of oversize material—for lowest conveyor maintenance and downtime. They provide smooth, fast motor acceleration . . . protect against overloads, stalling and motor burns-outs . . . reduce starting current demands . . . and permit selection of the smallest motors for the job. These profitable fluid drives are packaged for quick, easy installation . . . within minutes! Twin Disc Fluid Couplings are rated to 850 hp . . . HYDRO-SHEAVE Drives to 50 hp. Write to Twin Disc Clutch Company, Racine Wisconsin, for complete details.

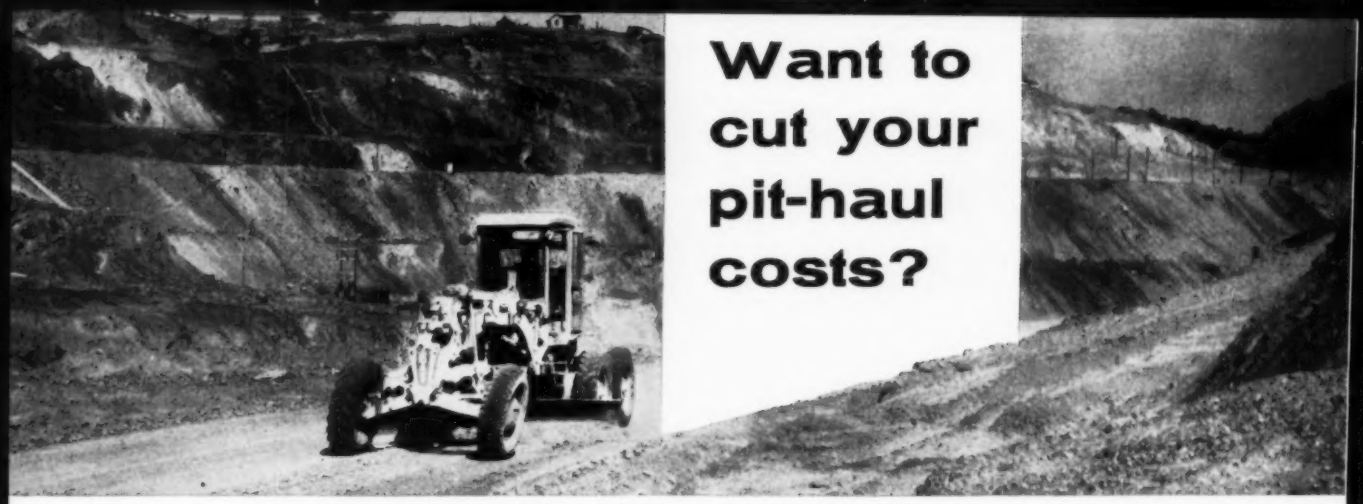
TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Los Angeles • Newark • New Orleans

Enter 146 on card, page 123



Want to cut your pit-haul costs?

How 15-speed "blade" can help your haulers make extra pit-to-plant trips every day

You'll reduce the per-ton cost of hauling, boost pit output every day, by traveling your haulers at higher speed. Faster haul speeds are practical *only* when your pit floor, benches, and haul roads are kept clean, smooth, and well drained. The better your surface, the faster you haul . . . the more trips per day, the lower your pit-haul costs.

To keep your haul routes in tip-top shape you need graders that can do maximum work. You need machines that can make heavier cuts, push bigger loads, work and travel faster . . . machines that can always work your tough materials at, or near, full power. This requires a wider range, and more selective gear-ratios than most graders afford.

More speeds for full-power work

Only Adams* 80 to 160 hp graders give you the extra work-speeds you need. They provide 8 standard speeds forward and 4 reverse, plus 3 creeper gears (opt.) . . . that's 15 speeds in constant-mesh transmission.

For building and maintaining haul roads, ditching, and clean-up at pit, plant, and stockpile, Adams gives you 4 efficient forward working speeds. Other graders with 6 forward speeds have only 3 working gears . . . often cannot develop full push-power at the faster speeds that are "just right" for the job.

Adams' 2 intermediate gears, 10 and 14 mph, are handy for light, fast blading, snow plowing, maneuvering and climbing tough grades. And travel speeds to 26 mph save time between grading assignments . . . time that can be used for extra blade-work.

Up to 30% more push-cycles on one-way grading

Most graders have only 2 reverse gears . . . about 3 and 7 mph. Adams has 4 reverse speeds — 2 for working, 2 for high-speed back-up. Adams' top reverse speeds (8 and 13 mph) pay big dividends. Often your operator works a 200′ to 400′ stretch, or even more, that is too short or too confined to make turning-around worthwhile. Instead, he backs-up. The Adams makes the reverse trip fast . . . converts usually wasted travel-time to extra blade-work.

Creeper gears for added "muscle", precise control of grade

Three optional creeper speeds, 31′ to 160′ per min. (full power, 0.41 to 1.82 mph), afford a means to concentrate full engine-power for ripping-up and regrading old roadways, pioneering for exploration and new roads, clearing overburden of stumps and roots and working thru rocky ground. They eliminate the costly common practice of "slipping the clutch" at high rpm to get maximum power at slow speed . . . reduce shock and clutch wear. Creepers also help you cut more accurate grades, and work in tight places.

190 and 135 hp POWER-*Flow*® Graders

For maximum push-power *at all speeds*, Adams POWER-*Flow* 660 and 550 torque-converter models give you the effective work-power of an *infinite* number of gear ratios, from 0.0 mph to 27 mph forward.

Any one of the 7 Adams graders — 190, 160, 135, 123, 115, 80, and 60 hp — will handle more work per $ investment. In any size, Adams model graders will keep your haul routes smoother — at less cost than any other method. Call us for full details on these modern graders built by LeTourneau-Westinghouse.

Adams graders can handle more of your type of jobs, save time and money with efficient interchangeable attachments. These include: *Scarifier* for ripping-up old roadways and rock-filled soil, *bulldozer* for spreading and casting dirt and road materials, *snow equipment* for clearing roads, *push-plate* for push-loading scrapers and starting balky haulers.

*Trademark G-1626-MQ-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

The Eaton Manufacturing Company, Cleveland, Ohio, has acquired the assets and business of the Cleveland Worm & Gear Company and its wholly-owned subsidiary, the Farval Corporation. Cleveland Worm & Gear will be operated as a wholly-owned subsidiary of Eaton under the guidance of its present management and with no changes in personnel, products, or sales policies.

The Farval Corporation, located in Cleveland, manufactures centralized pressure systems for lubricating plant equipment and machinery, as well as spray and circulating oil systems for similar uses.

Cleveland Worm & Gear, with headquarters and plants in Cleveland, has as its principal products worms, gears, and worm gear speed reducers used in power transmission machinery.

Eaton's manufacturing activities include a wide range of products for the passenger car and truck industries.

W. A. Keehn

J. R. Horton

The Construction Machinery Division of the Clark Equipment Company, Buchanan, Mich., has appointed WILLIAM A. KEEHN as special representative and JOHN R. HORTON as district representative.

Mr. Keehn will work with *Michigan* distributors throughout the country, primarily demonstrating new machines, visiting projects and plants, and evaluating customers' equipment needs. Before joining Clark he had been a demonstration operator for the Frank G. Hough Co. for 3½ years.

Mr. Horton will be responsible for sales of the *Michigan* line of construction and bulk materials handling equipment through distributors in Ohio, Michigan, Indiana, and Kentucky.

DR. ALBERT MULLER, assistant to the president of Air Reduction Sales Company, the industrial gases and welding products division of Air Reduction Company, Inc., has been appointed vice-president of that division.

Dr. Muller joined Air Reduction in 1946. Prior to joining the division in 1957 he was director of metallurgical research at the company's Central Research Laboratories, Murray Hill, N. J.

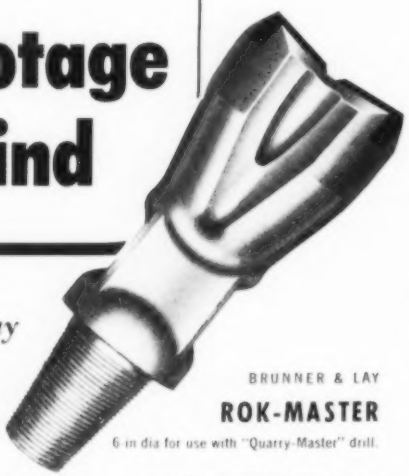
Appointment of DON E. CASTERLINE as manager of the Dallas, Tex., division of The General Tire & Rubber Company, Akron, Ohio, has been announced.

Mr. Casterline, former Detroit division manager, replaces CHARLES L. HOWES, who was transferred to the company's manufacturers' sales department. As Dallas division manager, he will supervise sales of replacement tires in areas of Texas, Oklahoma, New Mexico, and Louisiana.

More Footage per Grind

...with Brunner & Lay

CARBIDE INSERTS



BRUNNER & LAY

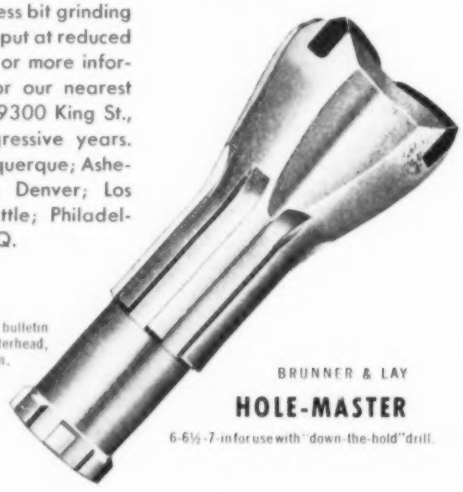
ROK-MASTER

6-in dia for use with "Quarry-Master" drill.

Big hole—hard ground—blasting jobs go faster when your machines are equipped with Brunner & Lay 6-6½ or 7-in bits. Special lapping process gives unusual resistance to wear and shock. You have less downtime, more profitime. Less bit grinding and steel handling, more output at reduced costs. For a demonstration, or more information, call your dealer or our nearest plant. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. 76 progressive years. Sales & Shop Service: Albuquerque; Asheville; Birmingham; Dallas; Denver; Los Angeles; Sacramento; Seattle; Philadelphia; Portland; .achine, P.Q.

Brunner & Lay carbide Master bits are available in sizes given. Our Rok-Bits in 1.000; 700; 600; 400; 200; J5.23; J5.5; J7.50 and standard wagon and hand held drill threads—in wide size range—and in these body types—cross, chisel, "X", cutaway and taper socket.

Write for this NEW bulletin DA I-58 on your letterhead, stating your position.



BRUNNER & LAY

HOLE-MASTER

6-6½-7-in for use with "down-the-hold" drill.

Brunner & Lay Products

CARBIDE ROK-BITS • INTRASET STEEL • DRILL RODS • COUPLINGS, ADAPTERS & SECTIONAL STEEL

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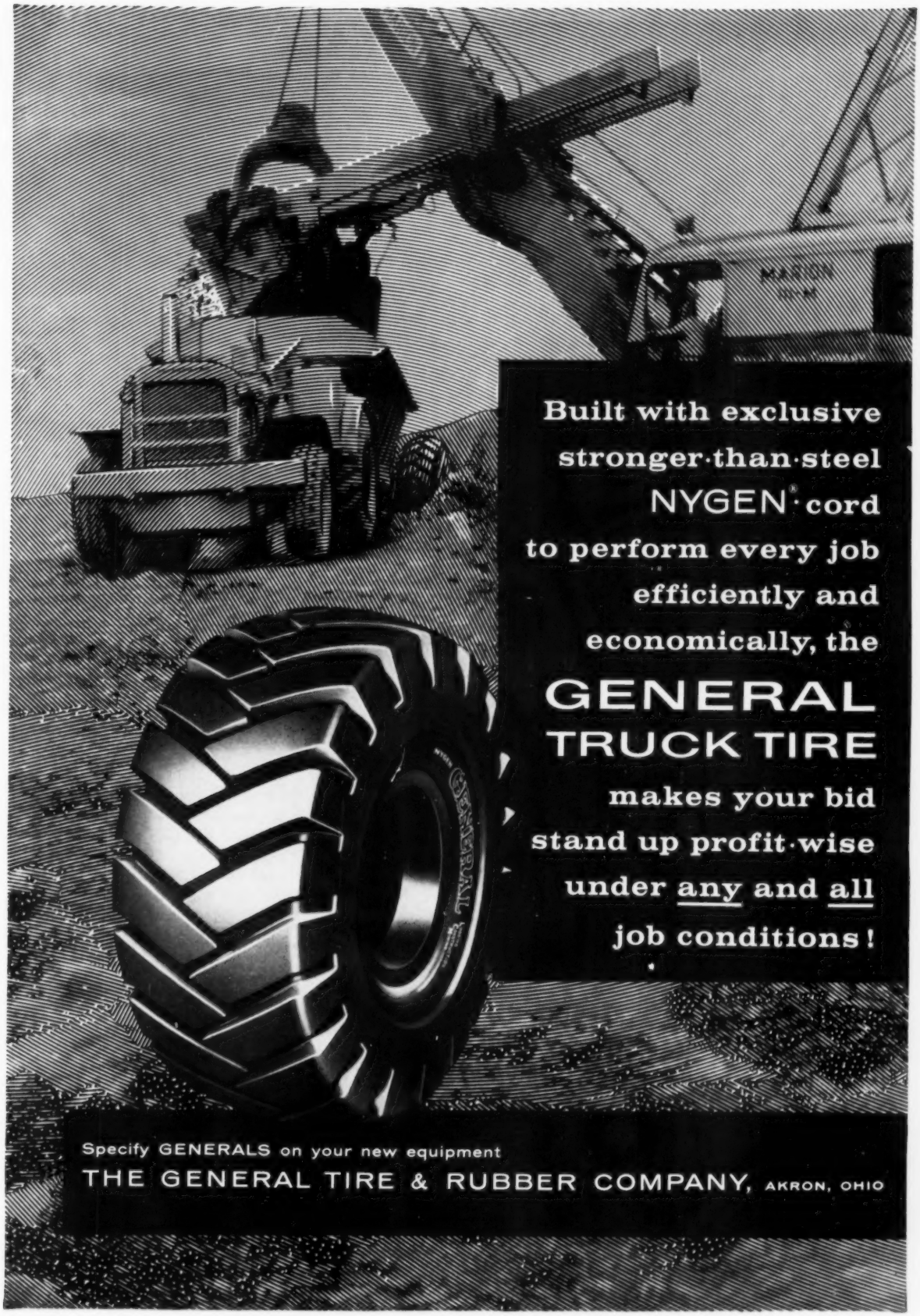
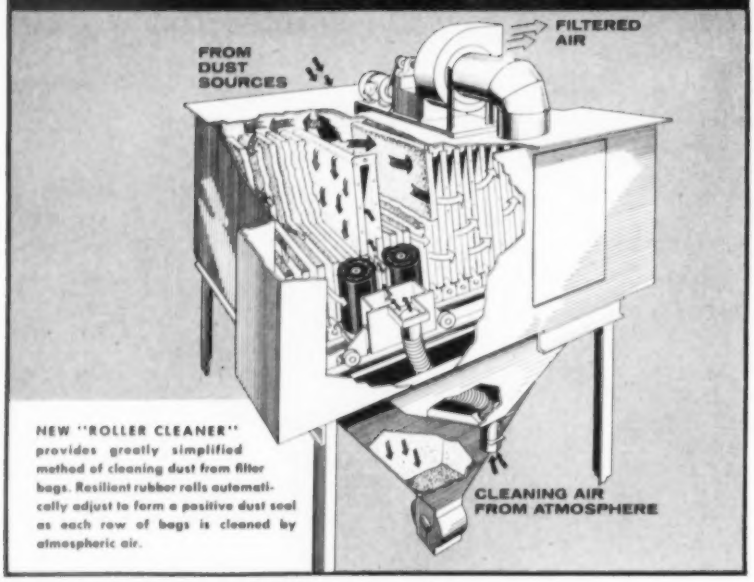
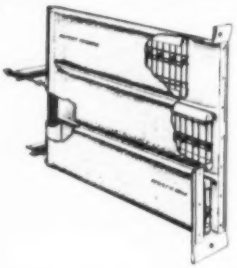

Built with exclusive
stronger-than-steel
NYGEN® cord
to perform every job
efficiently and
economically, the
GENERAL
TRUCK TIRE
makes your bid
stand up profit-wise
under any and all
job conditions!
Specify GENERALS on your new equipment
THE GENERAL TIRE & RUBBER COMPANY, AKRON, OHIO

NEW *SLY* DYNACLONE® DUST FILTER


FROM DUST SOURCES
FILTERED AIR
NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.
CLEANING AIR FROM ATMOSPHERE

Patent Nos. 2583039, 2695681, 2867289. Other Patents Pending.

NOW! As Much As 3 TIMES LONGER FILTER BAG LIFE



NEW SLY "RESIST-O-WEAR" FILTER BAGS (patent pending) provide complete dust filtration with as much as three times longer life than conventional bags. This has been proved on the toughest field installations.

The new bag has three equal-size sections. Each pocket has two spacers, making a total of six per bag. Weight is distributed on three seams rather than one, minimizing strain. A special protective flap on the back end prevents abrasion from incoming dust.

Now standard in the new "Roll-Clean" Dynaclone, Sly "Resist-O-Wear" bags combine with all the other superior Dynaclone features to assure greatest dust collecting efficiency with unequalled maintenance-free service.

ALL THESE FEATURES IN ONE DUST FILTER

- New "Resist-O-Wear" bags last as much as three times longer.
- Constant suction at dust sources—complete dust collection.
- Automatically self-cleaning for continuous operation.
- Free-rolling cleaner. Complete dust seal—automatic seal adjustment.
- Greater filtering capacity; smaller space requirements.
- Simplified construction for ease of inspection and servicing.

SEND FOR New Bulletin 105 and New 36-page Dust Control Catalog 104.

SINCE 1870 SLY

THE W. W. SLY MANUFACTURING CO.

4745 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

OVERSEAS LICENSEE: ANDREW AIR CONDITIONING LTD., LONDON S. W. 1, ENGLAND

Enter 150 on card, page 123

In adopting a new organizational framework, the Thayer Scale Corporation, Pembroke, Mass., has appointed CARL G. PETERSON president of both the parent company and its wholly-owned subsidiary, the Thayer Manufacturing Corporation.

The establishment of a separate manufacturing unit is the result of an extensive organizational analysis designed to strengthen the company's sales, engineering, and managerial functions.

Mr. Peterson, sales manager of the firm since 1950, has been associated with the field of industrial scales and weighing systems for the last 15 years.

The promotion of K. R. CHANDLER from assistant sales manager to the newly-created post of assistant vice-president of sales for the Koehring Division of the Koehring Company, Milwaukee, Wis., has been disclosed. Also announced is the appointment of WILLIAM B. DICKERSON as sales manager.

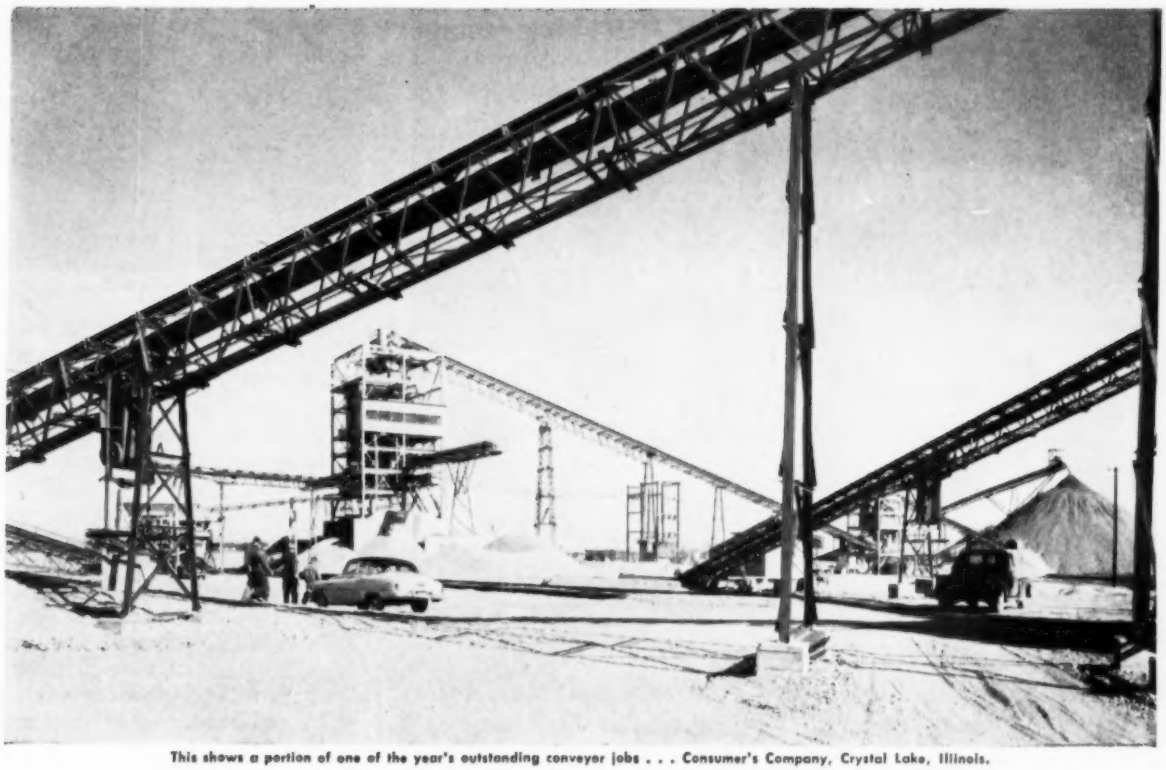
K. R. Chandler

W. B. Dickerson

Mr. Chandler joined Koehring in 1948 as an engineering trainee, later transferring to the sales department. He was appointed a district sales representative in 1952, worked in parts promotion, became service manager in 1956, and assistant sales manager in 1958.

Mr. Dickerson worked in field sales on the West Coast and in the northwest area for a construction equipment manufacturer before joining the Koehring organization.

The Western Machinery Company, San Francisco, Calif., has named HOMER A. HUMPHRIES plant manager of its Spokane office. Mr. Humphries was formerly service manager at the company's Phoenix office.



This shows a portion of one of the year's outstanding conveyor jobs . . . Consumer's Company, Crystal Lake, Illinois.

It's not true that Barber-Greene invented the belt conveyor

. . . but it is true that Barber-Greene introduced the greatest advance in belt conveyors since their invention —*standardization.*

Before Barber-Greene entered the field in 1916, belt conveyors were economical on paper—costly to build. Most installations were tailor-made, involving slow single-unit production . . . expensive field engineering . . . complicated assembly.

Then Barber-Greene developed a unique system of standardized conveyor components that quickly outdated ordinary methods of erection, operation and maintenance. Soon standardized conveyors were known for:

Faster delivery. Packaged units come from dealer stock or are immediately available from the factory.

Low-cost erection. Conveyors get into operation sooner with big savings in engineering costs.

Unmatched flexibility. Interchangeable parts simplify lengthening or shortening of conveyors to meet changing needs.

Today, standardized components are practical for installations of nearly every length, width and capacity. Wherever used, they give a new meaning to conveyor economy, utility and flexibility.

Drives, take-ups and similar units are completely assembled, aligned and adjusted by experts at the factory to assure trouble-free operation.

Write for literature or contact our conveyor division for details on your conveyor problem. BA-39PE

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

P...D...Q...

H-R Idlers Feature Price, Delivery, Quality

Priced competitively . . .
no extra charge for H-R "know-how"!

Delivered from local stocks . . .
warehoused nationwide for immediate replacement!

Quality design and workmanship . . .
One-shot lubrication from one side through all three pulleys!

Triple grease seal—redesigned to increase maximum service life!

Welded-in pulley heads using latest production techniques!

For information or service, contact your local H-R representative, or Hewitt-Robins, Stamford, Connecticut.

HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS . . . POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE . . . VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

H-R Product Manufacturing Plants in Buffalo, N. Y. • Chicago, Ill. • King of Prussia, Pa. • Passaic, N. J. Amsterdam, Holland • Johannesburg, South Africa • London, England • Montreal, Canada • Paris, France

Enter 152 on card, page 123

N. H. Williams

D. T. Grange

In a reorganization of executive personnel, WALDEN C. CUMMINS JR., NOLAN H. WILLIAMS, PETER H. CLAYTON, and DONALD T. GRANGE have become vice-presidents of Meissner Engineers, Inc., Chicago, Ill., and EUGENE A. BARTKUS, assistant chief engineer since 1955, has become chief engineer.

Mr. Cummins, who was named vice-president and treasurer, has been comptroller of Meissner Engineers since 1949. Mr. Williams, the new vice-president of engineering, has been with Meissner for over 10 years, and has served as chief engineer of the company since 1952.

The newly-elected vice-president for public relations, Mr. Clayton, has served as general counsel for the company since 1957 and continues to serve as special counsel to the president. Mr. Grange, vice-president and manager of construction, has been associated with Meissner since 1957, in charge of its construction department.

R. E. LENHARD has been elected president of the Air Reduction Sales Company, the industrial gases and welding products division of the Air Reduction Company, New York, N. Y. Formerly executive vice-president of the division, Mr. Lenhard succeeds J. H. Humberstone, who continues as vice-president of the Air Reduction Company.

J. GREGORY TIERNEY has been appointed sales representative in the Indiana, southern Illinois, and western Kentucky territory for H. K. Porter Company's Leschen Wire Rope Division, St. Louis, Mo.

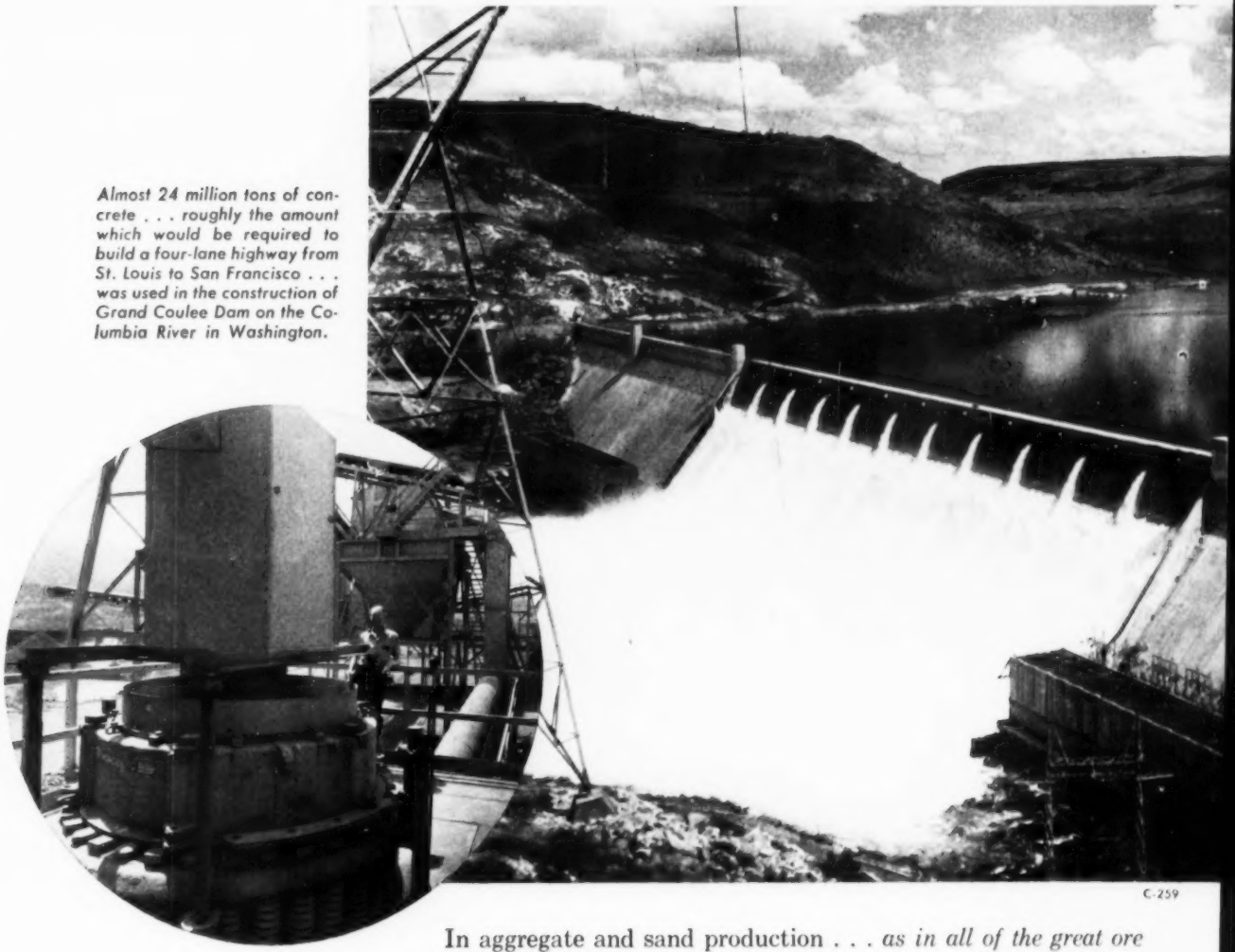
ELMER F. TWYMAN, who has served as a vice-president since 1950, has been elected senior vice-president of The Yale & Towne Manufacturing Company, New York, N. Y.

Enter 153 on card, page 123 →

SYMONS® CONE CRUSHERS

FIRST CHOICE for big volume—low cost production of quality Crushed Sand and Aggregate

Almost 24 million tons of concrete . . . roughly the amount which would be required to build a four-lane highway from St. Louis to San Francisco . . . was used in the construction of Grand Coulee Dam on the Columbia River in Washington.



C-259

In aggregate and sand production . . . *as in all of the great ore and industrial mineral operations the world over* . . . there has been no record to equal the performance of Symons Cone Crushers that have so consistently and efficiently produced great quantities of finely crushed product at low cost.

Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers for primary, secondary, or finer reductions, in capacities to over 900 tons per hour. Write for literature.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

NORDBERG MACHINERY

NORDBERG

SYMONS . . . a registered Nordberg trademark known throughout the world

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS
SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D. F.

DODGE PILLOW BLOCKS
WITH TIMKEN BEARINGS

America's super-quality line—with a 35 year record of keeping performance *up* and costs *down!* Five types—to fit practically any service condition. All assembled, adjusted, lubricated and *sealed* at the factory for precision performance—long life—dependability.

SPECIAL DUTY TYPE →

- Designed for extreme precision and high load capacities.
- Fully self-aligning.
- Special Duplex Timken Roller Bearing with tapered bore.
- Split tapered sleeve with straight cylindrical bore extends through entire length of housing.
- Easy to mount or demount. Adapter nut (or collar) clamps adapter sleeve to shaft with extreme firmness.
- Automotive type piston ring seals. Bearing is sealed both on and off the shaft.
- Rugged semisteel outer housing.
- Elongated bolt holes provide for lateral adjustment.
- Special dust cap protects lubrication fitting.
- Shaft sizes 1 15/16" to 8". Ask your local Dodge Distributor—or write us for Bulletin A670 giving complete technical data on America's most complete line of mounted bearings.

DODGE MANUFACTURING CORPORATION, 4000 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

DODGE
of Mishawaka, Ind.

product:

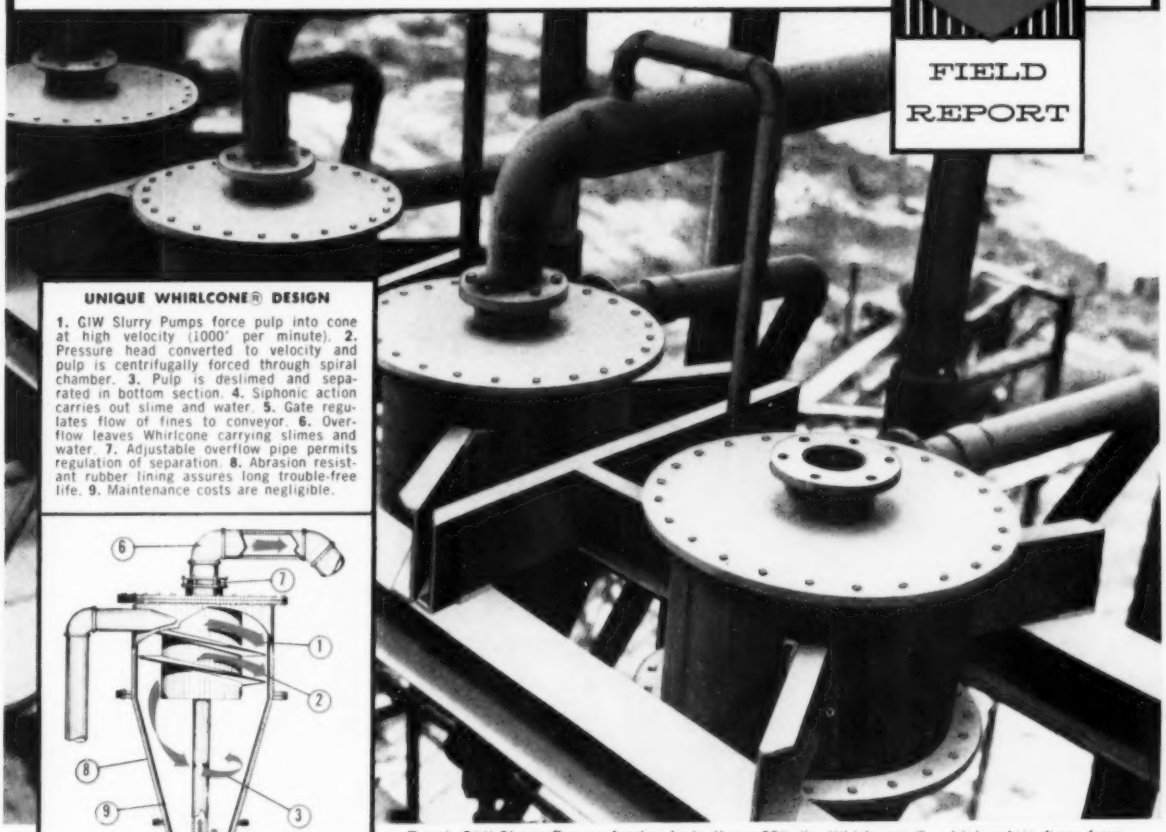
COTTRELL WHIRLCONE® SEPARATORS

customer:

BECKER COUNTY SAND & GRAVEL CO.

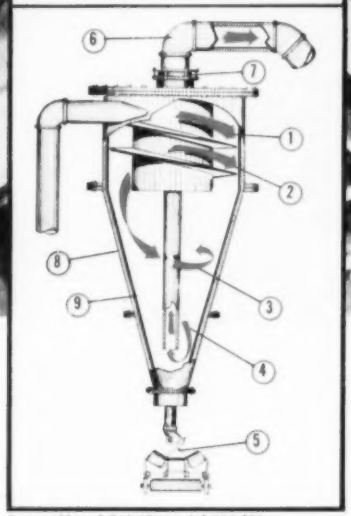
GIW

FIELD REPORT



UNIQUE WHIRLCONE® DESIGN

1. GIW Slurry Pumps force pulp into cone at high velocity (1000' per minute). **2.** Pressure head converted to velocity and pulp is centrifugally forced through spiral chamber. **3.** Pulp is deslimed and separated in bottom section. **4.** Siphonic action carries out slime and water. **5.** Gate regulates flow of fines to conveyor. **6.** Overflow leaves Whirlcone carrying slimes and water. **7.** Adjustable overflow pipe permits regulation of separation. **8.** Abrasion resistant rubber lining assures long trouble-free life. **9.** Maintenance costs are negligible.



Patent Nos. 2,738,070 and 2,806,599

Tough GIW Slurry Pumps feed pulp to these 25" dia. Whirlcones®, which retain fines from classifier overflow. Maximum recovery rate is 20 tons per hour per cyclone. The cones will handle material from −12 mesh to lightest slime.

Whirlcone® Separators solve difficult fine recovery problems.

The retention of fines in the −50 plus 200 mesh range posed a disturbing problem for the Becker County Sand & Gravel Co., of Cheraw, S.C., primarily because the large amount of water used in processing the sand and gravel washed out the desirable fines with the minus 200 slimes.

Fourteen 25" dia. Whirlcone® wet type cyclones installed parallel in four Becker plants solved this problem completely. Operating an average of 8 hours daily, they extract up to 100 tons of clean, fine sand per hour from wash water while the minus 200 mesh slime is discarded.

Recovered fines are used to bring sand up to specifications. Thousands of tons of valuable sand, formerly lost, soon paid for the low cost of the Whirlcones®.

GIW's highly efficient Whirlcones® are also being used in the mining fields to deslime, degrit, classify, concentrate, make dam and mine backfill and to dewater or thicken where the overflow can be returned to the process or it can be discarded.

They are available in diameters from 6" to 50". Capital cost including the pump is 20 to 50% of conventional classifiers.

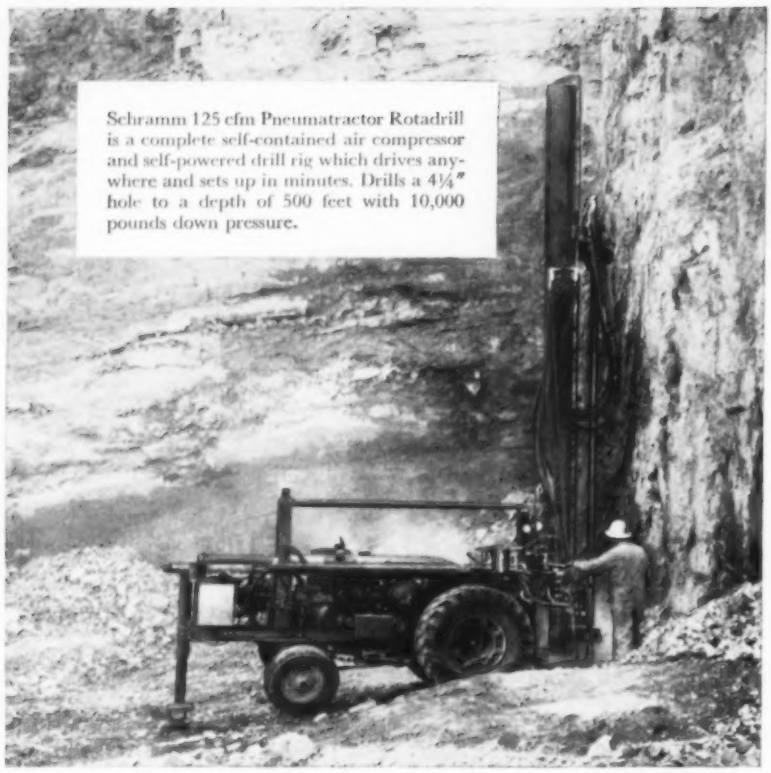
If you are losing fines from material −12 mesh to lightest slimes, write today. Recommendations and literature will be forwarded promptly.

COTTRELL ENGINEERING
Division of
GEORGIA IRON WORKS CO.

GIW

Manufacturers of pumps, dredges, separators and accessories.

AUGUSTA • GEORGIA



Schramm 125 cfm Pneumatractor Rotadrill is a complete self-contained air compressor and self-powered drill rig which drives anywhere and sets up in minutes. Drills a 4¼" hole to a depth of 500 feet with 10,000 pounds down pressure.

QUARRIES SEEKING TOP PROFITS USE SCHRAMM ROTADRILLS TO

Remove more tonnage at less cost

The more holes you drill, the more blasts you set off, the more tonnage you remove—the more profit you make. It's as simple as that. And that's exactly what you do with the Schramm Rotadrill, everytime! It's a sure fire way to make any quarrying operation more profitable. Look how these advantages can reduce your blasting costs.

Faster drilling rates. Rotadrills penetrate faster than other rigs because hydraulic down pressure is automatically regulated and an abundant supply of air removes the chips instantly and keeps the hole clean. Quarries report increased penetration of 55% to 66% in hard rock.

Less manpower. One man can move machine, drill, change steels without assistance. Sets up, ready to go in minutes—takes fewer man hours.

Lowest cost per ton. Schramm Rotadrills save time and manpower—cost less to operate. Let us show you how to cut your blasting costs with the Schramm Rotadrill. Write today for complete information.

See the Yellow Pages for Sales, Service and Rental of Schramm Rotadrills.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

640 North Garfield Ave. • West Chester, Pa.

Schramm 250 cfm Pneumatractor Rotadrill averages 12′ to 15′ per hour in very hard limestone with straight rotary drilling. With Rotatool, for bottom hole drilling, rates exceed 22′ per hour in hard limestone and 15′ per hour in trap rock.

Truck Mounted Rotadrills are gasoline or diesel engine driven, drill 6" holes with 26,000 pounds down pressure. Also available, Crawler Rotadrill (8" holes with 28,750 pounds down pressure) and "Do-it-yourself" package for mounting on your truck or tractor.

Enter 156 on card, page 123

E. K. Ludington Jr.

R. H. Ayers

W. N. Brock

H. B. Rue

At a recent board meeting, directors of the Chase Bag Company, New York, N. Y., elected ELLIOT K. LUDINGTON JR. executive vice-president. Mr. Ludington is succeeded as vice-president in charge of the firm's Paper Bag Division by R. H. AYERS, formerly sales manager of that Division.

The directors also elected FRANCIS H. LUDINGTON JR. vice-president and treasurer, succeeding CHARLES S. SHELDON, who will retire on March 1. Mr. Ludington was previously vice-president in charge of production.

W. N. BROCK, formerly vice-president and general sales manager, was named vice-president—director of sales. He is succeeded by H. B. RUE, formerly sales manager of the firm's Textile Division.

JOHN A. BREWSTER, newly-elected vice-president—director of West Coast operations, will continue to function in his present capacity as manager of the Chase branch in Portland, Oreg.

GLENN S. PARK has been appointed chief development engineer for the Body & Hoist Division of The Heil Company, Milwaukee, Wis. Mr. Park will direct the development of new equipment designs and will assist in the overall direction of the Body & Hoist Division Engineering Department.

Enter 157 on card, page 123 →

THE 40-R

Ability to handle the most punishing work and be ready when you need it makes the BUCYRUS-ERIE 40-R the most outstanding rotary drill on the market, under all drilling conditions

In Granite-Hard Formations operator can exert maximum down pressure on the bit for most effective penetration.

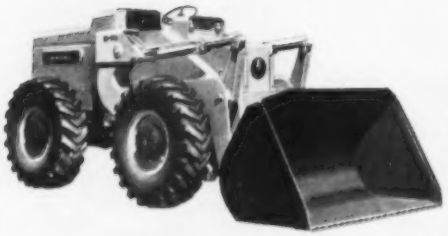
In Soft Formations operator increases rotating speed, eases the down pressure and keeps air velocity high so that the bit will not be buried or choked in cuttings.

In Fissured Formations the 40-R instantly adapts to each new set of conditions without stopping the operation.

For illustrated bulletins on the 40-R (diesel or electric for drilling 6¾ to 9-in. holes) or the 50-R (full electric for drilling 9⅞ to 12¼-in holes) write Dept. 1B59, Bucyrus-Erie Company, Drill Division, Richmond, Indiana.

BUCYRUS ERIE®

Builds Better Equipment



It COSTS LESS To BUY the BEST

NEW MODEL H-90

GIVES YOU MORE VALUE FOR YOUR MONEY... MORE CARRY CAPACITY... MORE PERFORMANCE... MORE DEPENDABILITY

When it comes to investing money in equipment which must earn money, you can't afford anything but the best. Thousands of owners have found this to be true of the famous HO "PAYLOADER"... thousands more will find it even more so in the new, improved Model H-90.

Full 9,000-lb. Carry Capacity

You can lift loads up to 15,000-lbs., but you can CARRY LOADS up to 9,000-lbs. which means you can use buckets ranging up to almost 4 cu. yds., depending on the weight of the material. Because the bucket tips back 44° at ground level, you can carry 9,000-lb. loads closer to the machine and lower with better balance, stability, speed and less spillage. All excess "dead weight" has been eliminated and through balanced design, the H-90 can carry more pounds in the bucket than comparable machines weighing as much as 3,000-lbs. more.

More Powerful Breakout

A breakout force of 21,000-lbs., almost the entire weight of the machine, can be applied to the cutting edge of the bucket through unique pry-out pads. This enables you to get full bucket loads in the toughest digging.

Choice of Four Engines

The new H-90 gives you a choice of two gasoline engines and two diesel engines: either the 125 H.P. Hercules WXLC-3 or the 134 H.P. I-H U-450 in the gasoline, and the 122 H.P. Cummins JN-6-B1 or the 126 H.P. G.M.C. 4-71 in the diesel.

Extra Heavy-Duty Planetary Axles

Because tractor-shovels of this size and capacity are subjected to greater than average stresses and strains, the H-90 "PAYLOADER" planetary axles are special, extra heavy-duty type with power transfer differentials.

Full Protection for Long Life

The brakes of the front wheels are sealed to prevent scoring and glazing by foreign matter. Large oil-bath air filters and cartridge-type oil filter protect the engine. Two cartridge-type oil filters protect the hydraulic system oil and the transmission-torque converter oil.

Easy, Full-Power Operation

Power-shift transmission with three speeds forward and reverse, plus twin-cylinder power-steer and 4-wheel power brakes, assure fast operation with minimum operator effort... promote a high production rate the full shift.

More Attachments... More Uses

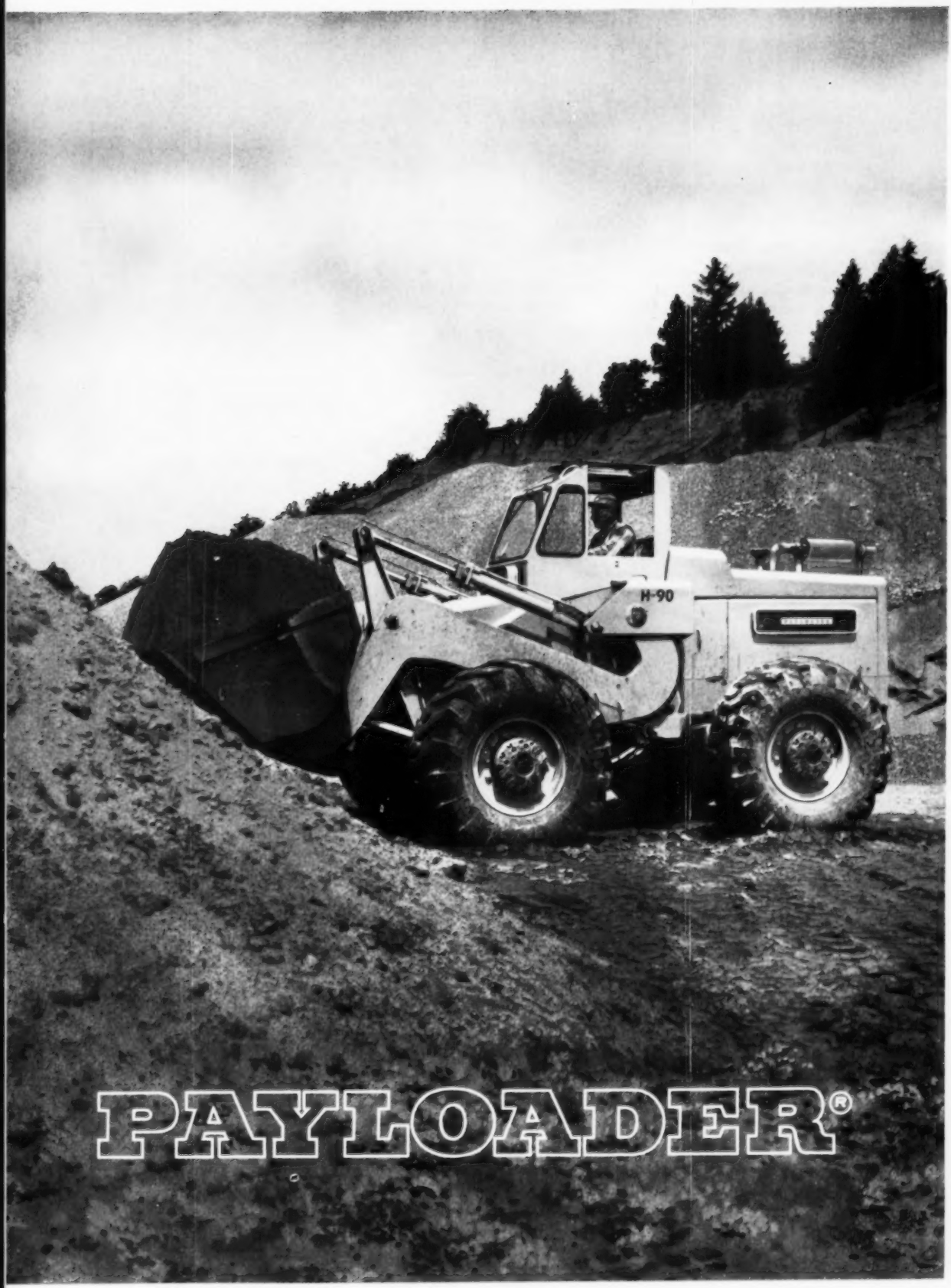
The widest choice of attachments are available, including these exclusive ones: Drott 4-in-1 bucket, Superior side-boom, Galion vibratory compactor, Ram black-top spreader... also blower, "V" and blade plows, angling back filler, scarifier, winch and others.

THE FRANK G. HOUGH CO. 1-8-1
750 Sunnyside Ave., Libertyville, Ill.
Send data on new Model H-90 PAYLOADER

Name _____
Title _____
Company _____
Street _____
City _____ State _____

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY


H-90
PAYLOADER®

DR. LAUCHLIN M. CURRIE has been elected a vice-president of The Babcock & Wilcox Company, New York, N. Y., and placed in charge of the atomic energy division.

To accept the new B & W post, Dr. Currie retired as a vice-president of the Union Carbide Nuclear Company, a division of Union Carbide Corporation.

Reynolds Machinery Company, Omaha, Nebr., has been named to sell and service *Michigan* tractor shovels, tractor dozers, tractor scrapers, tractor loggers, tractor wagons and excavator cranes manufactured by Clark Equipment Company's Construction Machinery Division at Benton Harbor, Mich. Reynold's territory covers several counties in western Iowa and eastern Nebraska.

Officers of the new *Michigan* distributorship are L. I. Reynolds, president; M. K. Kipper executive vice-president; M. E. Reynolds, vice-president; and D. DeVries, secretary-treasurer.

HARRY E. BEANE JR. is the new sales engineer serving the Albany-Syracuse area for the Bristol Company, Waterbury, Conn. He has been transferred from Bristol's Newark, N. J. district, and is making his headquarters in Schenectady.

VERNE E. MINICH, founder of the Wheelabrator Corporation, Mishawaka, Ind., and honorary chairman of the board, died on December 13, in a New York City hospital following an illness of several months.

Seabrook Machinery, Inc., Tallahassee, Fla., has been appointed an excavator distributor for north central Florida and southwestern Georgia by the Bucyrus-Erie Company, South Milwaukee, Wis.

Seabrook Machinery will offer sales and service on the full line of Bucyrus-Erie 3/8- and 4-cu. yd. convertible excavators and cranes and 10-, 15-, 25-, and 35-ton capacity transit cranes.

G. A. WYNKOOP has been assigned to the California and Nevada territory of the Euclid Division's western region.

For the last year Mr. Wynkoop has been district representative for Euclid in Montana and the Canadian provinces of Alberta and Saskatchewan.

Euclid's western regional office, managed by M. H. Johnson, is located in Oakland, Calif.

G. A. Wynkoop

C. F. Skinner

CHARLES F. SKINNER has been named vice-president and general manager of the Western-Knapp Engineering Company, San Francisco, Calif. Mr. Skinner has directed WKE's world-wide engineering, design, and construction services as general manager since 1955.

In 1936 Mr. Skinner joined the Engineering Department of Wemco, a division of the Western Machinery Company.

In 1940 he became Eastern District manager, and later assistant general manager. As European representative in 1950 and 1951, he formed an organization of European distributors and licensees to handle company services and products. He was named general manager of Western-Knapp in 1955.

Power Transmission, Inc., Denver, Colo., has appointed HARRY BULLOCK as vice-president. Mr. Bullock comes to Power Transmission with years of experience in supervising major installations all over the world which include the crushing, screening, and washing plant at the Ghandi Sagar Dam, New Delhi, India; overland conveyor systems for the Central Farmers Fertilizer Company in Montpelier, Idaho; the unloading, storage, and overland system at the Eisenhower Lock, St. Lawrence Seaway Project, Messina, N. Y.

BROOK ELECTRIC MOTORS ARE BEST!

All things considered, BROOK A. C. MOTORS are best for powering crushers, screens, washers, apron feeders, and conveyors in sand and gravel pits and quarries. They are built for dependable, maintenance-free, all-weather service under severe conditions. Yet, they *cost less* than ordinary motors. 1 to 600 H.P. Warehouse stocks, factory representatives and dealers coast-to-coast. Send for literature.

SINCE 1904
BROOK MOTOR CORPORATION

world's most respected motor

BROOK MOTOR CORPORATION

3553 W. PETERSON AVE., CHICAGO 45, ILL.

In Canada: Brook Electric Motors of Canada, Ltd.
250 University Ave., Toronto, Ontario

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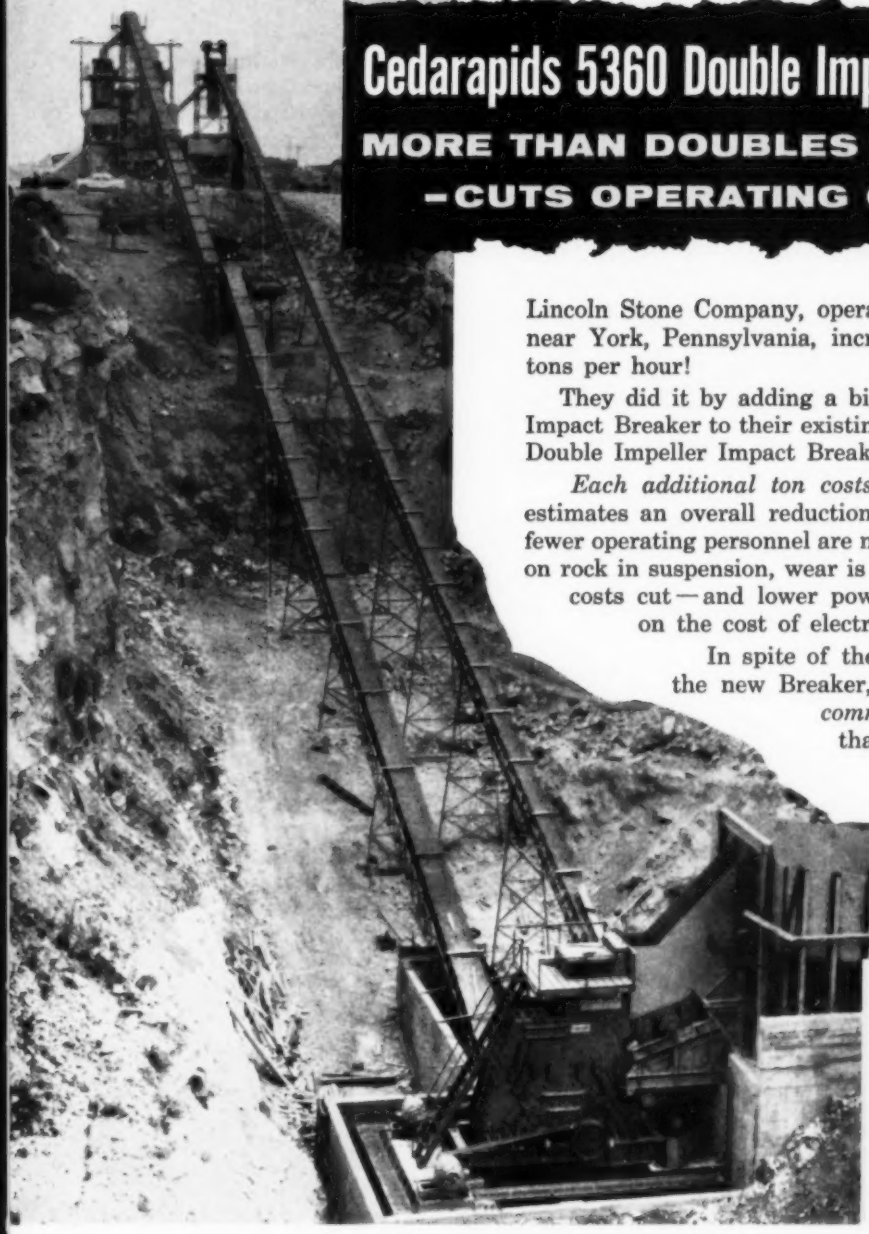
Enter 161 on card, page 123 →

Cedarapids 5360 Double Impeller Impact Breaker

MORE THAN DOUBLES PLANT CAPACITY –CUTS OPERATING COSTS BY 25%



Lincoln Stone Company, operating this 100% Cedarapids plant near York, Pennsylvania, increased capacity from 400 to 1000 tons per hour!

They did it by adding a big Cedarapids 5360 Double Impeller Impact Breaker to their existing plant, which consisted of a 4350 Double Impeller Impact Breaker followed by two Hammermills.

Each additional ton costs less to produce! Lincoln Stone estimates an overall reduction in operating expenses of 25% — fewer operating personnel are needed — with 50% of rock breaking on rock in suspension, wear is sharply reduced and maintenance costs cut — and lower power consumption saves 7¢ per ton on the cost of electricity.

In spite of the increased capital investment for the new Breaker, *Lincoln Stone can now produce commercial stone for at least ⅓ less* than local competition using different make crushers!

1000 Tons Per Hour? —1250? —1500?

"We can't feed this Breaker fast enough to find out what its capacity really is," says owner WALTER SIPE

Although Lincoln Stone doesn't know the actual capacity of their big new Breaker (it has been averaging between 900 and 1000 tph, 85% minus 5" stone), *they do know that their Cedarapids engineered plant is production-balanced* for big tonnages. Each Cedarapids unit—Breakers, Vibrating Grizzly, Hammermills, Screens, Conveyors—is in proper balance with the others in both size and capacity.

You can profit by the experiences of other Cedarapids owners. Your Cedarapids Dealer is well-qualified to help you combine expert engineering with the most productive equipment for your job. Call him today!

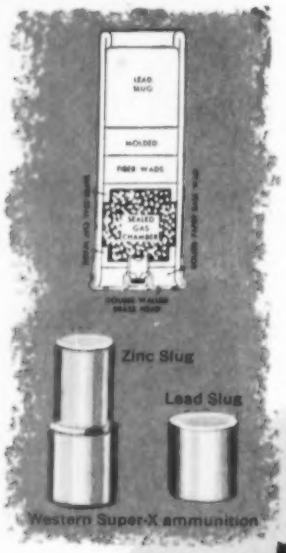
Production-balanced with the other units in the plant, two Cedarapids 5′ x 16′ triple deck Horizontal Vibrating Screens easily handle the big tonnages from the main plant conveyor.

Cedarapids — Built by IOWA

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

ONLY
RINGBLASTER
KILN GUN



assures greater smashing power backed by extra safety features

Break kiln rings faster, with fewer shots and less kiln down-time! Extra-powerful Western Super-X ammunition, fired from a Ringblaster heavy-duty kiln gun, cuts "keyways" better. Super-X offers outstanding accuracy, proved through ballistics tests and extensive on-the-job use.

Only Ringblaster has so much extra safety built-in, along with exceptional power, ease of operation, efficiency and exclusive sound-reducer to deaden firing noise.

Ringblaster is available to rotary-kiln operators on a lease basis. Write for further information on how Ringblaster and Super-X team to make kiln operations more profitable than ever before.

In addition to Ringblaster, the versatile Ramset System includes Ramset powder-actuated and Shure-Set hammer-in tools and fasteners.

OLIN MATHIESON CHEMICAL CORPORATION
KILN RINGBLASTER GUN

Ramset® Fastening System

WINCHESTER-WESTERN DIVISION • OLIN MATHIESON CHEMICAL CORPORATION
12175-B BEREA ROAD • CLEVELAND, OHIO

Enter 162 on card, page 123

A national association for independent tractor parts rebuilders, parts manufacturers, suppliers, and distributors was recently formed at a convention at Roanoke, Va.

Officers of the association are: president, Sam B. Maxmon, president of Maximon Machine Co., Inc.; vice-president, Edwin A. Hess, secretary-treasurer of Allied Welding and Manufacturing Co.; secretary, Harry Cooke, Automatic Welding Co.; and treasurer, Clarence A. Goss, president of Goss Supply Co.

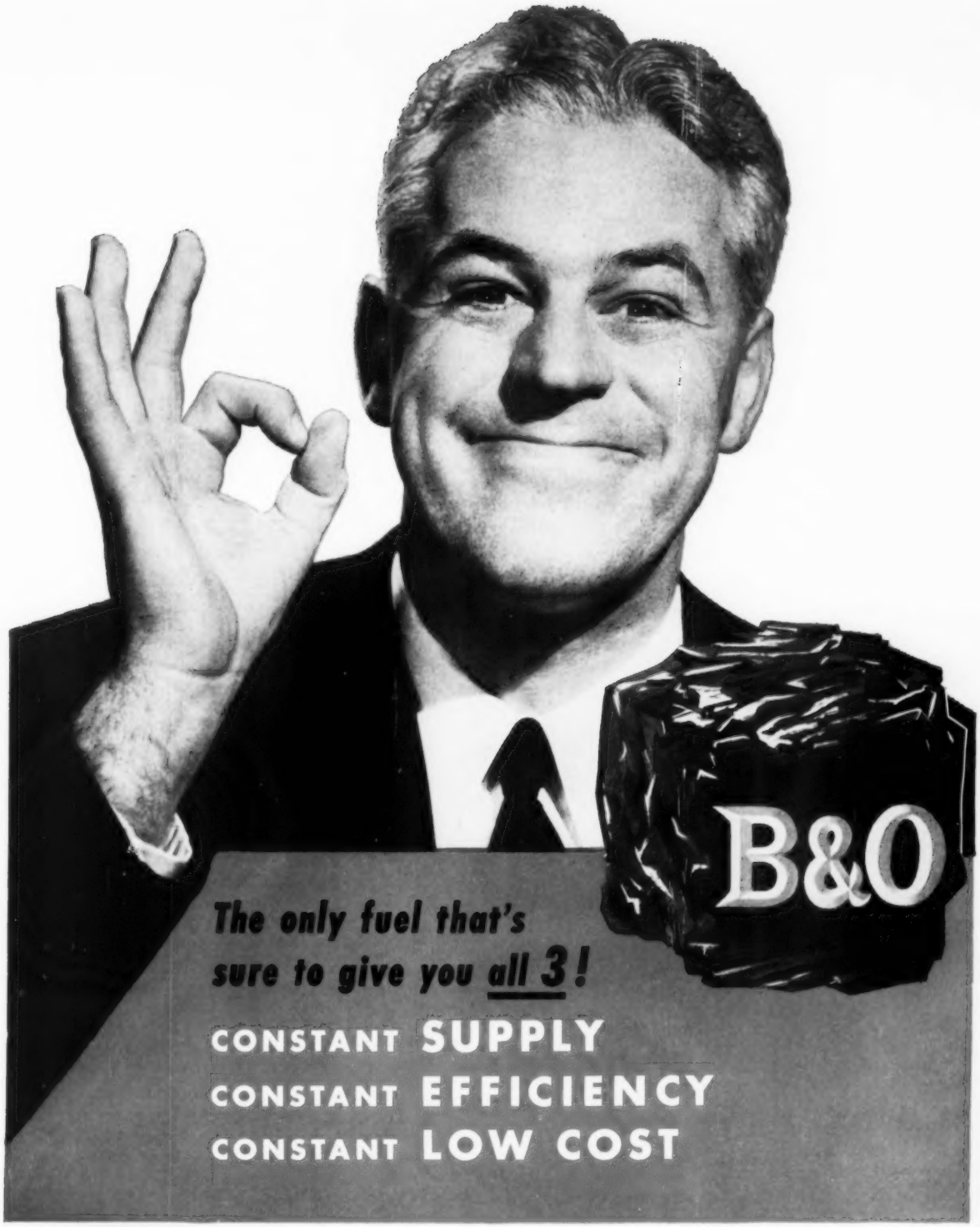
Responsibilities of the officers include determining a national headquarters location, recommending a detailed high standard for rebuilding to which all members must subscribe, and setting up the first annual convention for June, 1959.

JULIEN R. STEELMAN, president of the Koehring Company, Milwaukee, Wis., was elected chairman of the board of directors of the International Road Federation at its meeting in New York on December 18. Mr. Steelman assumed office on January 1, succeeding H. S. Merriman, retiring chairman.

New training school facilities have been established at the Elyria plant of The Thew Shovel Company, Lorain, Ohio. The new factory service school offers distributor and owners' servicemen both classroom and practical training in servicing the company's *Lorain* line of power shovels and cranes and the *Moto-Loader* line of front end loaders.

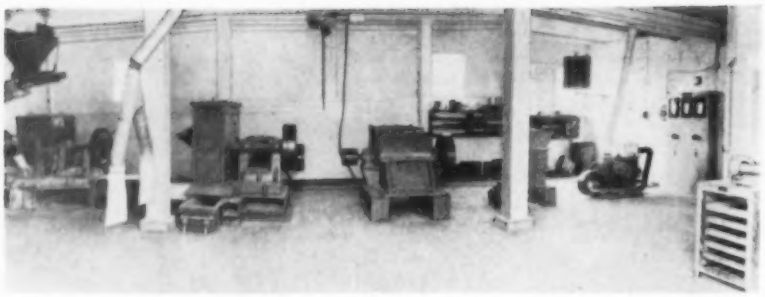
The school started on December 1 and continues for six months. The newly-formed Thew Marketing Division is in charge of the expanded training program.

Koppers Company, Inc., Pittsburgh, Pa., is constructing a new Research Center at Monroeville, Pa., according to Dr. Paul W. Bachman, vice-president and director of Koppers Research and Development. An administration building, three chemical laboratories, a power plant, and supporting facilities will be constructed on the 176-acre tract of land near Pittsburgh.



B&O BITUMINOUS COALS FOR EVERY PURPOSE

Ask our Man! BALTIMORE & OHIO RAILROAD, BALTIMORE 1, MD. *Phone* LExington 9-0400



The new testing laboratory of The Stedman Foundry and Machine Company, Inc., at Aurora, Ind.

In its new Testing Laboratory at Aurora, Ind., The Stedman Foundry and Machine Company, Inc., has installed full-size production machines plus automatic recording instruments to determine accurately horsepower requirements, speeds, and capacities of various materials being tested. Screen analysis and actual samples of product are furnished to Stedman's prospective customers.

A wide variety of materials, chemicals, minerals, stone, gravel, etc., can be analyzed in the new Testing Laboratory. Included in the Stedman Laboratory are full-size hammer mills, impactors, and cage disintegrators, so that the best type of crusher or pulverizer to meet the particular requirements for today's specifications can be easily determined.

Use of the new Stedman Testing Laboratory is open to readers of PIT AND QUARRY without obligation or cost. For complete information, contact Stedman Foundry and Machine Company, Aurora, Ind. A form listing all of the necessary details will be forwarded without obligation.

FORGED*
(NOT A CASTING)

This is IT! . . . the new forged and heat treated alloy steel drop ball, forged from "Cape AnAlloy"*. Now available after three years of development, this "Cape Ann" product outwears all competition — assures maximum economy in use.

SONIC TESTED • FIELD TESTED

Write for complete details

CAPE ANN ANCHOR & FORGE CO.
P.O. Box 360 • Gloucester, Mass.

Enter 164 on card, page 123

A new Detroit manufacturers' agency, Air Systems, Inc., has been formed by a merger of three Detroit firms. The new organization will market American Air Filter Company's air filter, dust control, heating and ventilating, air conditioning, and engine and compressor products, as well as its Illinois Engineering specialties.

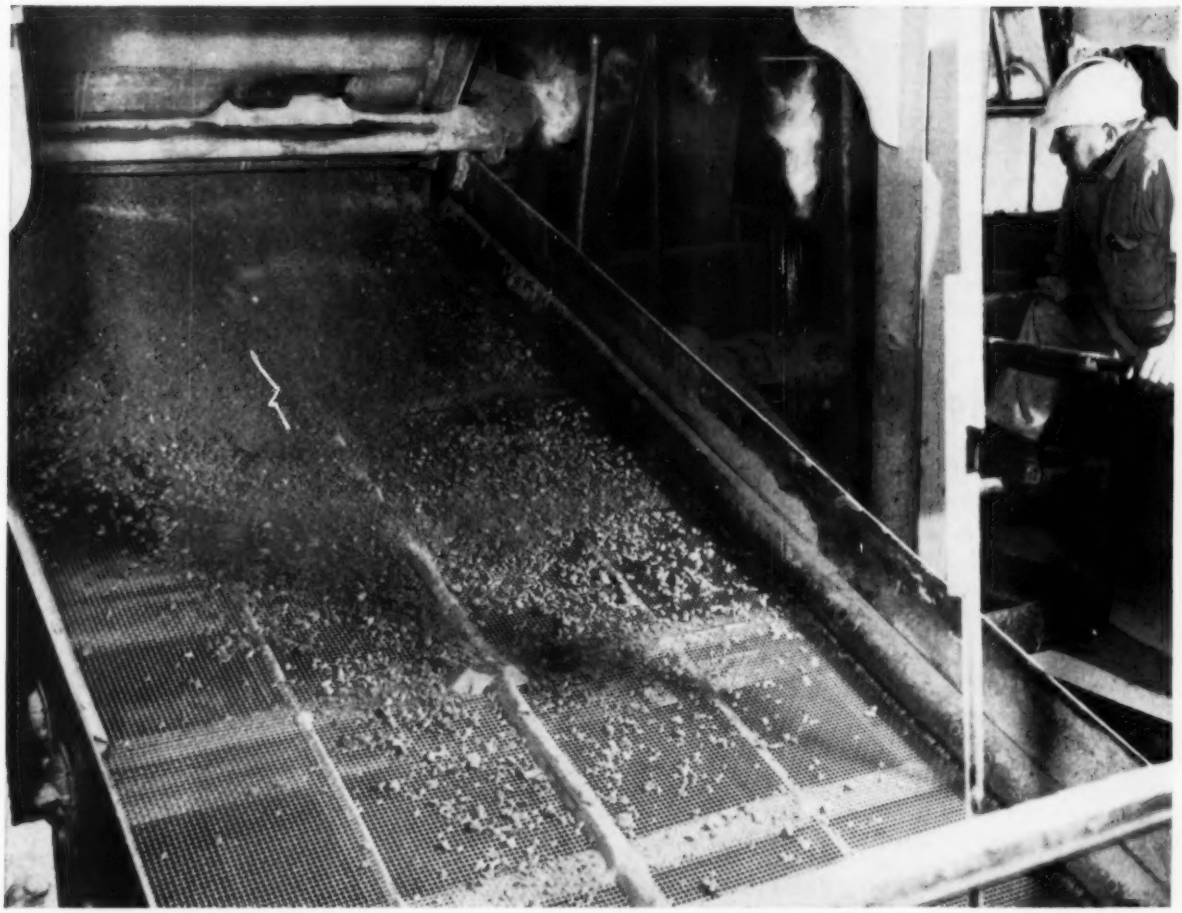
All employees of the three firms, Saunders & Company, Earl W. Graham, and American Air Filter's Detroit branch office, will make up the personnel of Air Systems. Al Saunders has been named president of the new firm; Charles Trambauer, vice-president; Earl W. Graham, vice-president and secretary; and Ken Wagoner, vice-president and treasurer.

Dario Sobrino, president of Sobrino S.p.A., Milan, Italy, died at his home in Milan after a brief illness. Mr. Sobrino's company has for many years been Italian sales representative for many United States manufacturers, including Easton Car & Construction Company, Sturtevant Mill Company, Kennedy Van Saun Manufacturing & Engineering Corporation, Northern Blower Company, Henry R. Jahn & Son, Inc., and Harnsichfeger Corporation.

JACK H. HOW, president of Western Machinery Company and Western Knapp Engineering Company, has been elected president of the San Francisco Chamber of Commerce for 1959.

ADRIAN E. ROSS, president of Sprague & Henwood, Inc., Scranton, Pa., has announced the formation of a new, wholly-owned subsidiary, Sprague & Henwood International Corporation. This new subsidiary will handle all export business of Sprague & Henwood, Inc., formerly handled by the Philips Export Company.

The following officers were named: president, A. E. Ross; executive vice-president, H. J. Longmore; vice-president and treasurer, Paul Mertzweiler; and secretary, E. H. Norton Jr.



at DEWEY PORTLAND CEMENT COMPANY...

CF&I SPACE SCREENS give top abrasion resistance and grading accuracy

Dewey Portland Cement Company of Linwood, Iowa, quarries more than 1,352,000 tons of rock annually, and produces some 2,500,000 barrels of high grade cement a year. Many tons of quarry production pass over and through CF&I Space Screens. Each screen takes a tremendous beating, since the quarry operation is geared to a 600-650 ton an hour screening operation. Yet Clyde Gregg, Dewey's master mechanic says:

"Since they were installed two years ago, our CF&I Space Screens have held up better and longer than anything we've tried before."

Abrasion, of course, is the primary problem here, as in all quarrying operations. Mr. Gregg reports: "The CF&I Space Screens have given better than average results with regard to abrasion resistance."

"Grading accuracy is also very important," Mr. Gregg continues, "and when making road and concrete stone for the open market, we've been able to maintain close standards by using CF&I Space Screens."

Maintenance has been no particular problem at the Dewey Portland plant, and, in Mr. Gregg's words, "Less downtime, in the replacement of CF&I Space Screens, has permitted us to maintain top production schedules."

On this point of easy replacement, Mr. Gregg particularly complimented the service obtained from CF&I sales representatives. "They have been most helpful in making certain we get the right screens for the right job, to meet our varying production demands, and in assuring proper fit," Mr. Gregg reports.

Like many another user, Mr. Gregg was enthusiastic about the rugged construction of CF&I Space Screens and the close quality controls under which the screens are manufactured. He indicates that they have never had a CF&I screen cloth breakdown due to a loose weave. He feels that, "Vibration within the cloth, which can cause a major hole and throw stone grading out of balance, is eliminated because CF&I really weaves their screens tight at the plant."

Whether your problem is accuracy, abrasion, vibration, corrosion, chemical reaction, long-life service or maintenance . . . there's a CF&I Space Screen designed to serve your needs. For further information, contact the CF&I sales office nearest you.

CF&I **SPACE SCREENS**

THE COLORADO FUEL AND IRON CORPORATION

6346

In the East **WICKWIRE SPENCER STEEL DIVISION**
Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

In the West **THE COLORADO FUEL AND IRON CORPORATION**
Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Ft. Worth
Houston • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland
Pueblo • Salt Lake City • San Antonio • San Francisco • San Leandro • Seattle
Spokane • Wichita

CF&I OFFICE IN CANADA: Montreal

CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

"Our first 24's stripping record sold us on our

—Luttjohann Stone Co., Topeka, Kansas

"When our first Torque-Converter TD-24 went to work in November, 1957 it stripped 50% more overburden than its steering-clutch competitor," reports John Luttjohann, Luttjohann, Stone Co., Topeka, Kansas. "It cut our stripping costs per yard so much, we bought our second one in June, 1958.

"Now the two TD-24's are giving us lower stripping costs than we've had in recent years, in the face of generally higher costs. The Torque-Converter '24's' are superior machines, powerful enough to push big loads in all conditions, even when frequent heavy rain made a swamp of the quarry.

"'24's' are fast, so we can make the long pushes pay off. And '24's' are trouble free. We haven't lost any time with these two machines in almost 2,000 hours of the roughest work in the quarry."

Luttjohann Co. compared performance!

The Luttjohann's proved by direct comparison that their Planet Power-steered TD-24 could rip and strip 50% more overburden than a 20-ton steering-clutch competitive rig.

Planet Power steering eliminates load-limiting "dead-track drag," keeps full-time "live" power on both tracks. You don't "half-kill" your power and traction to control the TD-24—on turns as you must with any king-sized steering-clutch tractor. You get bonus-load follow through—and don't spill the extra-profit yardage with "jerky" steering.

You can "adjust" TD-24 track speed to assure full-bite performance, benching or highwalling—where steering-clutch rigs can only "nibble"!

Prove the big yardage increase you can get with a Planet Power-steered International TD-24. Measure the capacity increases you also get with this Hi-Lo, full-power planetary shifting. Check the fast production-boosting TD-24 reverse speeds. Ask your International Construction Equipment Distributor for a demonstration!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

Enter 166 on card, page 123

economy second"

With the ripper-equipped Torque-Converter TD-24, the Luttjohann quarry rips tough rock layers into movable spoil. They push slabs of rock as heavy as 40 tons, with the blade. Daily crusher output average is about 1,000 cu. yd.

One TD-24 sells another by outproducing a king-sized competitive crawler by an amazing 50%—stripping overburden in side-by-side comparisons at Luttjohann Stone Co., Topeka, Kansas! Here are their Torque-Converter "24's."

As a result of action taken by the boards of directors, the Thermoid Company has become an important part of the new Thermoid Division of the H. K. Porter Company.

Porter's new Thermoid Division will manufacture and market all rubber and friction products formerly made by Thermoid and Porter's Quaker Rubber Division. The division's plants are at Philadelphia, Pa., Tenton, N. J., Pittsburg, Calif., Nephi, Utah, Huntington, Ind., Danville, Ill., Charlotte, N. C., and Mexico City, N. M.

The new Porter Division is headed by Warren E. Hill, former Thermoid president, as vice-president and general manager, and George Dauphinais as vice-president — operations. J. R. Alexander is vice-president—marketing, and E. G. Counselman is general sales manager.

CHARLES S. REDDING, 75, chairman of the board of directors and former president of the Leeds & Northrup Company, Philadelphia, Pa., died after a brief illness.

St. Regis Paper Company, New York, N. Y., announces the appointment of ROBERT F. CALLAHAN as manager of its Multiwall Packaging Division sales office at Kansas City, Mo. He was formerly a sales representative at the San Francisco office.

Other appointments have been announced within the Division. FRANK H. RENDLER, who was manager of the Kansas City office, has been transferred to the Chicago sales office.

George R. Stone has been promoted from representative to manager of the Los Angeles office.

JOSEPH A. FIORETTI, formerly sales engineer in the Eastern District, has been appointed to the Division's General Sales Staff as materials handling specialist, with headquarters in New York.

Formerly on the General Sales Staff, JOHN H. DIVELY has been named manager of engineering of the division's new South-Southwestern sales district, with headquarters in Birmingham.

ALLEN H. JONES has been elected vice-president, sales and engineering, of The W. W. Sly Manufacturing Company, Cleveland, Ohio.

For the last three years, Mr. Jones served as director of engineering. Prior to that, he was the company's Chicago District manager. In his new post, he will continue to supervise the company's product improvement and new product development programs, in addition to directing the expansion of the customer service program.

A. H. Jones

R. M. Trent

RALPH M. TRENT has been elected president of the Pangborn Corporation, Hagerstown, Md. Concurrent with Mr. Trent's appointment, ROBERT H. MCCAULEY was elected a director of the corporation. Both appointments fill the unexpired term of Victor F. Stine, recently deceased.

Mr. Trent has been associated with the Pangborn Corporation for 28 years. He was Pangborn's district manager in Pittsburgh, Pa., for 14 years and West Coast district manager for 10 years. In 1957 he returned from Pangborn's Pacific Coast field organization to the home office in Hagerstown as executive vice-president.

Mr. McCauley has served as Pangborn's general counsel for 30 years.

C. O. VANZANT has been named manager of the Bronx, N. Y., distributorship of the Cummins Engine Company, Inc., Columbus, Ind. Mr. Vanzant joined Cummins as a sales representative in 1957 and later was appointed branch manager at Little Rock, Ark.

G. C. CAFFEY has been appointed branch manager of the Little Rock branch to succeed Mr. Vanzant. Previously Mr. Caffey was parts manager of the Cummins distributorship in Memphis, Tenn.

where there's a
drying operation
leading manufacturers insist*
on DUSTEX COLLECTORS

DUSTEX miniature cyclone tubes, cast of white iron, provide an ultra-hard, cling-free, self-cleaning surface to assure maximum material recovery at a constant, high-speed rate.

DUSTEX patented design prevents condensation within the collector when inlet temperature is above the dew point. Handles temperatures up to 800°F. There are no filters to clog, no sludge to pump. It's virtually maintenance free!

LOW INSTALLATION COST and up to 99.8% efficiency make DUSTEX the perfect collector for spray dryer, rotary dryer or flash dryer processes.

**Name on request*

Write today for this free bulletin on the new D-584 DUST COLLECTOR.

P.O. BOX 2520, BUFFALO 25, N. Y.

dustex CORP.

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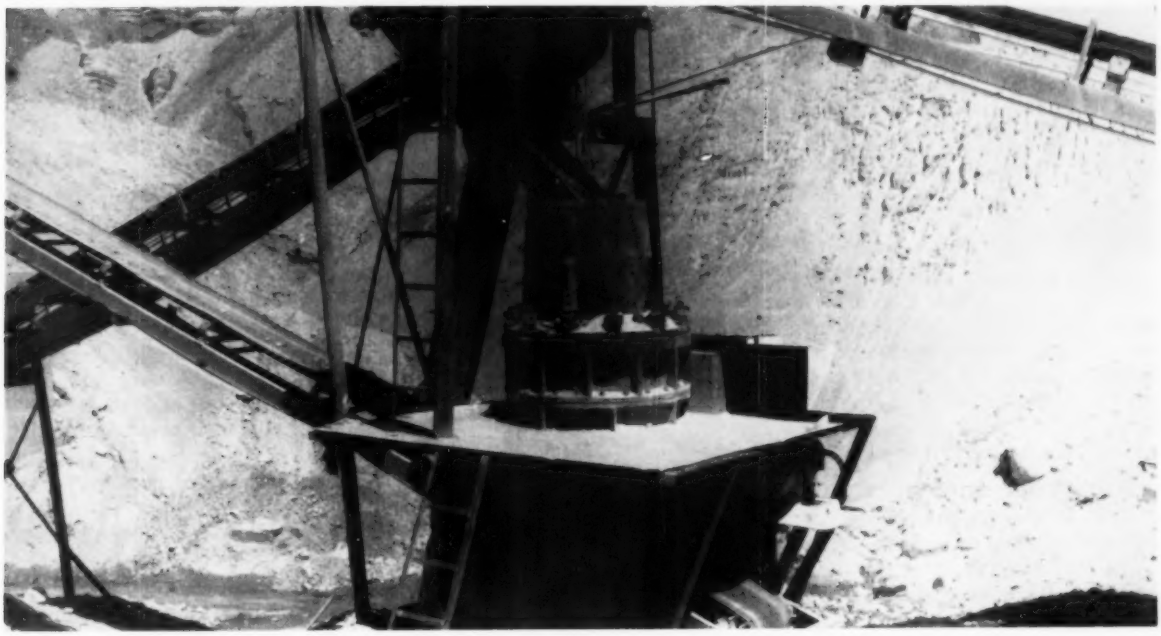
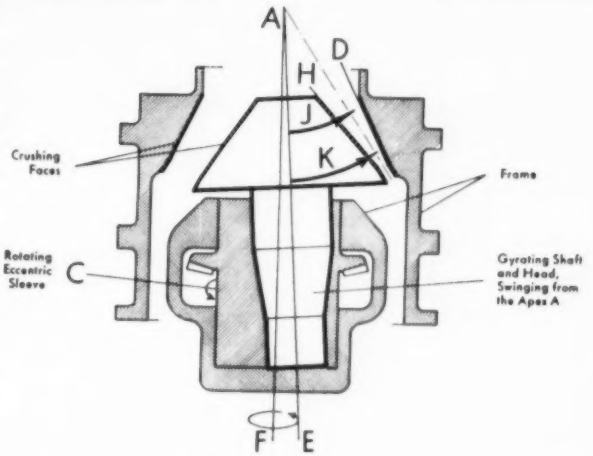
Compact **KUE-KEN**® for economical reduction crushing in permanent or portable plants



Profitable secondary crushing is practical in any flow sheet with Kue-Ken gyratory crushing. Compact and strong yet without excess weight, choke-fed Kue-Ken fits easily where headroom is limited and is readily portable. Charging conveyors are lower and shorter . . . lower first cost, lower operating cost. Designed on the exclusive Kue-Ken "crushing without rubbing" principle that reduces the main cause of liner wear, Kue-Ken liners give far longer service under continuing, hard materials crushing. For lowest cost-per-ton crushing, design your operation around Kue-Ken gyratory crushers.



See how Kue-Ken crushing faces pass through crushing zones on arcs J and K to crush rock squarely without rubbing liners.

KUE-KEN® **CRUSHERS**

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

DEALERS:

SEATTLE, WASH	Washington Machinery Co.
VANCOUVER, B. C.	Universal Equipment Co.
SALT LAKE CITY, UTAH	Lund Machinery Co.
SAN ANTONIO, TEX.	Closner Equipment Co.
PORTLAND, ORE.	Contractors Equipment Co.
LOS ANGELES, CALIF.	Garlinghouse, Fremon Co.
BERKELEY, CALIF.	West Coast Engine & Equip. Co.
PHOENIX, ARIZ.	Stapley's

Industry Personalities

P. S. Barnett

PAUL S. BARNETT has been promoted to the position of general traffic manager for Ideal Cement Company. Mr. Barnett, who was formerly assistant traffic manager, succeeds the late T. C. Taylor. His headquarters will be in Ideal's Denver office, and he will direct and supervise Ideal's traffic activities in the 14 states where the firm has cement plants or subsidiary operations.

The appointment of WARREN G. BURRES to the position of district engineer of the Los Angeles office of the Portland Cement Association has been announced by James D. Piper, the Association's vice-president for promotion.

Mr. Burres, who has served as personnel training manager at the Association's general office in Chicago since January, 1957, assumed his new duties on December 15. He succeeds John M. McNerney, who was recently appointed western regional manager for the association.

D. L. Ziegler

DANIEL L. ZIEGLER has been appointed assistant to the vice-president-operations, for the Alpha Portland Cement Company, Easton, Pa. Prior to his promotion, Mr. Ziegler was company project manager. He supervised construction of the firm's recently completed cement plant at Lime Kiln, Md.

Much of his work since joining Alpha Portland Cement has been concerned with the building and planning of improvements at the Company's plants, particularly those in St. Louis, Mo., and Catskill and Jamesville, N. Y.

LINC C. VARCO has been appointed to the newly-created position of distribution superintendent for the Pacific Northwest Division of Permanente Cement Company.

Mr. Varco will be responsible for cement distribution from plants at Seattle, Bellingham, Portland, and Pasco, with headquarters at Seattle.

A 20-year veteran with the Kaiser companies, he previously was superintendent of Permanente's Seattle distribution facility.

A. B. Ward

A. B. WARD has been appointed sales manager of the Nashville Division of Marquette Cement Manufacturing Company.

Mr. Ward has been a Marquette sales representative in Tennessee for the last 17 years. The announcement was made by A. W. Hicks, regional sales manager.

RHYS L. STANGER, sales manager of the Ruberoid Company's St. Louis, Mo., district, has been appointed manager of asphalt and asbestos products sales.

CHARLES L. HAUGH, assistant sales manager of the New York sales district, has been made sales manager at St. Louis.

GEORGE J. GARTHWAITE has become assistant sales manager of the New York district. All three appointments became effective immediately.

Charles L. Haugh, a sales representative since 1947, joined Ruberoid in 1955 and became assistant sales manager of the New York district in 1956.

WILLIAM A. CAVANAUGH, sales manager of the Buffalo Crushed Stone Corporation, Bowmansville, N. Y., plant for the last 14 years, has retired after 39 years service with the company. He had been vice-president and sales manager since 1944.

W. T. Burns

WILLIAM T. BURNS has been appointed works manager of Kaiser Chemicals Division, Kaiser Aluminum & Chemical Corporation, Mass Landing, Calif.

Mr. Burns succeeds D. M. Kerr, who retired from the company recently. Mr. Burns previously had been assistant works manager.

DR. ALLEN V. ASTIN, director of the National Bureau of Standards, U. S. Department of Commerce, has announced the appointment of Dr. Robert D. Huntoon to the newly created position of deputy director. In this post, Dr. Huntoon will serve as alternate to the director in external matters, and will exercise day-to-day direction and review of Bureau programs, working through the Associate Directors for Engineering, Chemistry, the Boulder (Colorado) Laboratories, Planning, and Administration. He will continue to serve as associate director for physics.

CHARLES HOMRIGHOUSE of Cedar Falls, Iowa, has been named district sales and service manager for the Concrete Materials Company, Concrete Materials & Construction Company, and the Clayton Silica Company, all affiliated and located in Cedar Rapids, Iowa. His districts include eastern Iowa and northern Minnesota.

R. W. HOLUB of Des Moines, Iowa, has been named district sales and service manager for the Crushed Stone Division of the Concrete Materials & Construction Company. His district includes Des Moines, southwest Iowa, and northwest Missouri.

N. J. ALBUS of Humboldt, Iowa, has been appointed district sales and service manager for the Concrete Materials Company and the Clayton Silica Company. His district will include Des Moines ,western Iowa, and eastern Nebraska.

"My Boss Read the Specs with Tears in His Eyes"

He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier — " (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.

Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3′ to 18′.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 104A Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
PULVERIZERS
MICRON-GRINDERS

STURTEVANT MILL CO.

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

MIXERS
BLENDERS
ELEVATORS
AIR SEPARATORS

P. Maddox

The appointment of PAUL MADDOX to the newly - created position of manager of market research and development has been announced by the management of Mexico Refractories Company, Mexico, Mo.

Mr. Maddox has previously acted as special representative, co-ordinating Mex-R-Co sales to the refinery industry and engineering firms. Before joining the Mexico Refractories organization in 1954, he was associated with the Laclede Christy Fire Brick Company.

Michigan Chemical Corporation, St. Louis, Mich., announces the appointment of BOGARDUS WERTH to its chemical sales staff.

Mr. Werth comes to his new assignment from Virginia Carolina Chemical Corporation where he was assistant sales manager for agricultural chemicals. Prior to that he was employed by the Virginia State Agricultural Extension Service as assistant county agent and county agent in northern Virginia.

OTTO KROECK, salesman for Gibsonburg Lime Products Company, Gibsonburg, Ohio, has developed three new devices for preparing plaster. The Lime-O-Timer and Hydro-Limer, are to be used for measuring water in the making of lime; and the Water Wizard permits correct and neat measuring of water, particularly by the barrel.

R. J. Doermann

RICHARD J. DOERMANN has been appointed technical service representative for the Permanente Cement Company's Southern California sales division. Mr. Doermann will consult with and advise concrete suppliers, contractors, and material testing agencies on technical matters arising from the use of cement.

The appointments of CHARLES F. MORAN as structural engineering specialist, and ROBERT E. JONES as paving engineer and general field engineer, in the newly-established San Francisco office of the Portland Cement Association have been announced by John M. McNerney, western regional manager. A third civil engineer is yet to be named to the northern California staff.

At the same time, the appointment of BYRON E. JONES as paving engineer and general field engineer in Oregon was announced by Mr. McNerney. Mr. Jones will have his headquarters in Portland.

G. R. Sullivan

GEORGE R. SULLIVAN was elected vice-president of the A. P. Green Fire Brick Company, Mexico, Mo., after a meeting of the company's board of directors.

Mr. Sullivan was also reappointed director of industrial relations, a position he has held for the last nine years.

ADOLPH L. ROSSITER, assistant traffic manager in the Kansas City, Mo., office of Universal Atlas Cement Division, United States Steel Corporation, retired on October 1 after 48 years of service.

Mr. Rossiter, widely known in Kansas City's traffic and transportation circles, began his career with Universal Atlas in the Pittsburgh office in 1910. He was transferred to Kansas City in 1939 as representative for the cement division. In 1946 he was appointed assistant traffic manager at Kansas City.

ROBERT L. KERSHNER has been appointed project engineer at the Columbia Cement Division of the Columbia-Southern Chemical Corporation at Zanesville, Ohio. In his new position, Mr. Kershner will be responsible for studies relating to plant expansion and modernization. Prior to his new appointment he was maintenance superintendent of the Standard Chemical Plant, also a division of the Columbia Southern Chemical Company.

M. H. Winkler

MARSHALL H. WINKLER, former chief engineer and cement plant superintendent, Bessemer Limestone and Cement Company, Bessemer, Pa., has been promoted to general superintendent.

Prior to his employment at Bessemer, Mr. Winkler served as Basic Division engineer for the Pittsburgh Coke and Chemical Company, Pittsburgh, Pa.

PAUL F. KEATINGE, General Portland Cement Company, Chicago, was recently elected to the board of directors of the Producers' Council, Incorporated, the national organization of building product manufacturers and associations.

WILLIAM F. STONE has been named chief chemist at the Cape Girardeau, Mo., plant of the Marquette Cement Manufacturing Company. He succeeds Guy B. Matthews, who died unexpectedly on October 17.

JACK P. VAN GELDER was recently named Central Pacific Division sales manager for the United States Gypsum Company, with headquarters in San Francisco.

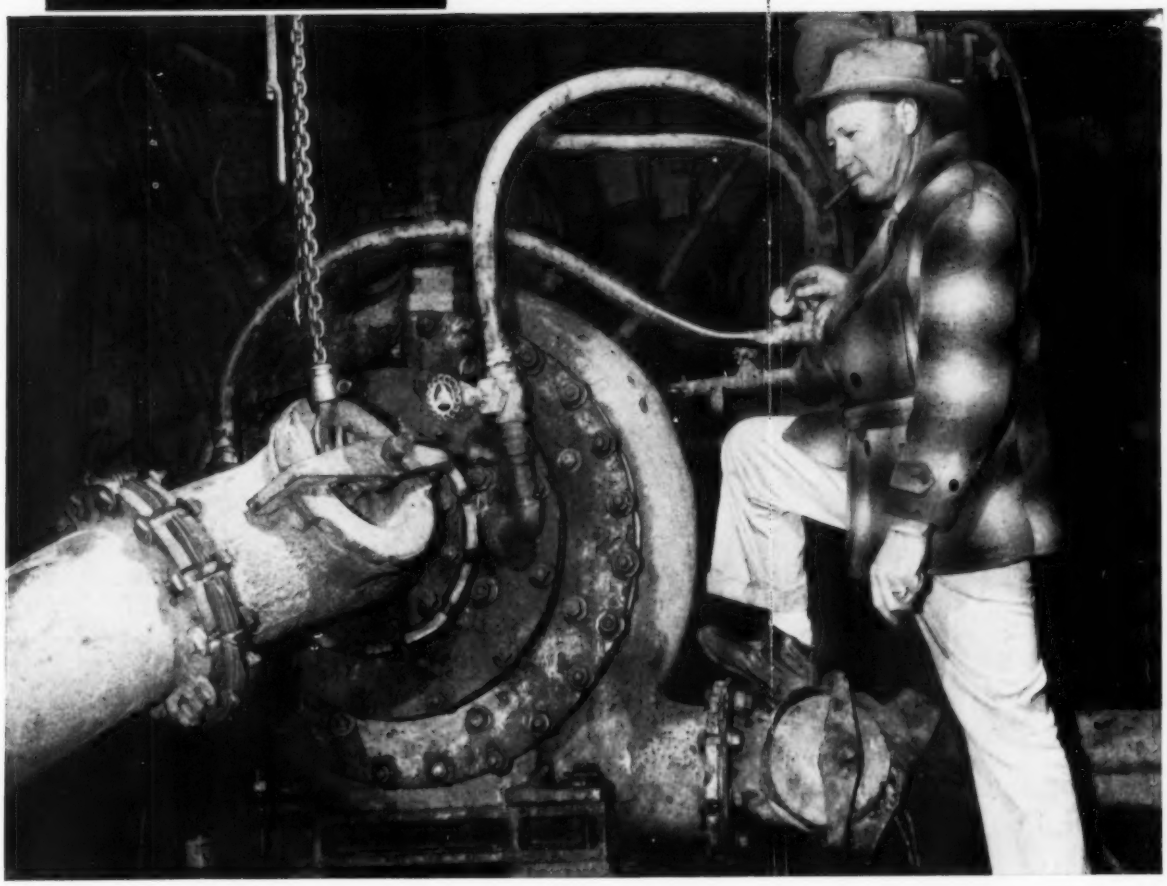
WILLIAM E. NILSON succeeds Mr. Van Gelder as Oakland district manager.

WALTER R. COOK has been elected a vice-president of Texas Industries, Inc., according to Ralph B. Rogers, president.

Mr. Cook is also vice-president of Redondo Tile Company, a California subsidiary of Texas Industries. He joined Texas Industries in November, 1955, as management co-ordinator.

ANDREW LUNDTEIGEN JR. has been elected vice-president of operations of the Ash Grove Lime and Portland Cement Company, Kansas City, Mo. He had previously held the position of chief engineer at the company.

Amsco pump application file —Oklahoma City, Oklahoma



"Complete change-out for this 8-inch Amsco takes only 8 hours . . ."

"This Amsco pump design is really simple," says Mr. R. O. Pruitt, Plant Superintendent of Makins Sand & Gravel Company, Oklahoma City manufacturers of ready-mix concrete and asphalt.

"It's so simple, we never take more than 4 hours from shut-down to on-stream for replacement of either impeller or suction liner." A complete change-out, impeller and suction liner never requires more than 8 hours.

"Maybe this easy repair is one of the reasons we've used Amsco pumps for about 40 years now. We've got this 8-inch Amsco and a 6-inch Amsco working the pit together," says Mr. Pruitt.

"We get about 200 hours service out of liners, impellers and shells before rebuilding by welding. That's pumping a 50-50 sand and gravel mix," he adds.

Makins' 8-inch Amsco pump is driven by a 150 h. p. electric motor, flat-belt drive, using plain suction. Pipeline is 91′ with a 40′ lift. The pump lifts sand and gravel to classifying equipment.

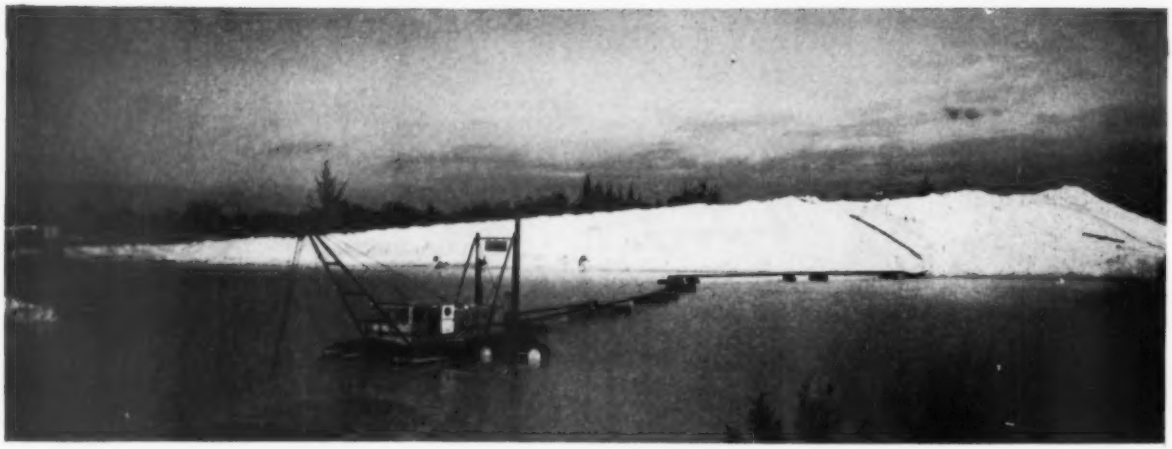
Amsco® Dredge Pump standard sizes range from 6″ to 20″ discharge openings. Larger sizes are also available. Ask for an Amsco pump engineer to discuss your requirements. Or write for Bulletin 1052P, containing full information and specifications on the Amsco line.

AMERICAN Brake Shoe COMPANY

AMSCO American Manganese Steel Division
Chicago Heights, Illinois

COST CONSCIOUS?

— STOCK-PILING OR PUTTING IT ON SCREENS NOTHING BEATS THE DIXIE DREDGE



WRITE FOR BULLETIN 658

SERVICE MACHINERY CORP.

BOX 225 NORTH MIAMI, FLA.

Enter 174 on card, page 123

LIMITED QUANTITIES STILL AVAILABLE

BRAND NEW

LIGHTWEIGHT AGGREGATE PLANT MAP

Our newest combination map and listing is a *must* to anyone interested in the lightweight aggregate field. All lightweight aggregate plants known to be in existence are listed alphabetically, by state. In addition, the plant's address and the brand name of the lightweight aggregate it produces is given.

This combination map and listing is 25½ inches wide and 22 inches high. The sturdy paper stock it's printed on makes it ideal for framing or pasting on any flat surface.

The following are the quantity prices charged for this map.

QUANTITIES	PRICE
1 — 10 maps	35¢ each
11 — 20 "	30¢ "
over 20 "	25¢ "

We will be happy to fill your order for any number of maps you may desire.

PIT & QUARRY PUBLICATIONS, INC.

431 S. Dearborn St. Chicago 5, Ill.

Announcing . . .

TERRIFIC USED EQUIPMENT BARGAINS

▼

See **PIT & QUARRY'S**

Broadcast Section

PAGES 182-191

WRITE FOR OUR RATE CARD

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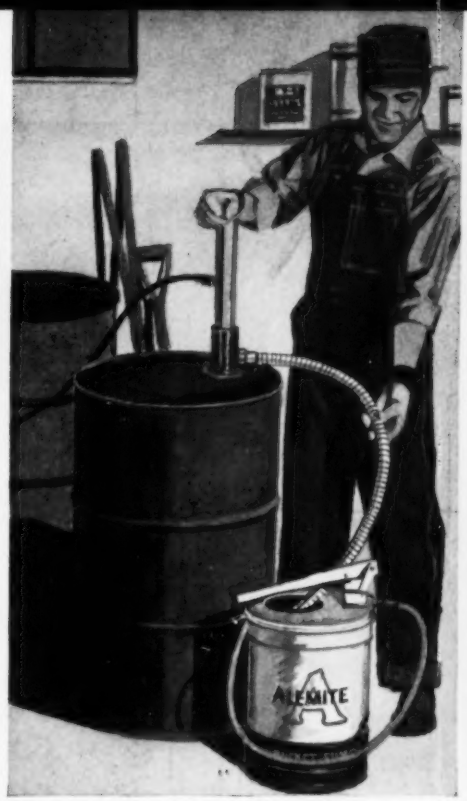
Alemite Loader Pump is 3¾ Man-Hours Faster than hand loading, for every 100 lbs. of grease used! Insures delivery of *clean* grease, free of dust and grit that can cause costly breakdown. Just a few strokes fill gun. Models to fit and seal any original container—from a 400-lb. drum to a 25-lb. pail. No mess—no waste!



Alemite Transfer Pump is 63% Faster than hand method! Transfers 37 lbs. of pressure gun grease per minute, direct from original drum to loader pump, bucket pump or power gun. Lubricant is always sealed—fully protected from contamination or waste. Fully adjustable delivery rate. Weighs only 15½ lbs.!

Alemite Bucket Pump With Adjustable Leverage and Greater Capacity lubricates hundreds of bearings with fewer refills! Handles either oil or grease. Adjustable three ways for using any lubricant in any weather . . . at pressures from 2,500 to 5,000 lbs. Capacity, 35 lbs. Sturdily built for construction industry use.

HOW ALEMITE PUTS MORE JOB-TIME INTO YOUR DAY

. . . and cuts maintenance costs, too!

Faster Lubrication With Alemite Means Less Downtime—More Job-Time!

Heavy-Duty Alemite Hand Guns Save Valuable Time On Toughest Lube Jobs! Handle all pressure gun greases. Spring-primed for positive delivery—long operating handle for maximum leverage. Follower rod disappears after filling. Loader fitting permits fast, clean filling (or gun may be filled by suction). Pressures up to 15,000 lbs.; lubricant capacity up to 24 ounces.

Send for complete catalog today!

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1850 Diversey Parkway, Chicago 14, Illinois

Please send me your complete catalog on Alemite lubrication equipment for the construction industry.

Name .....

Company .....

Address .....

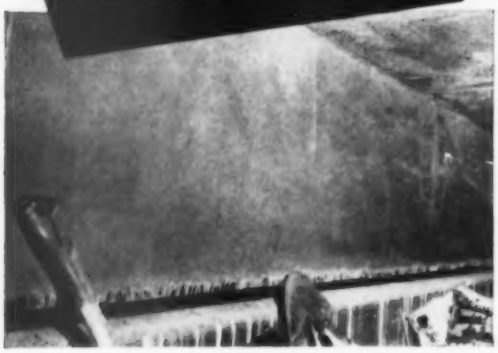
City ..... State .....

Symbol of SW Excellence

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

HERE'S VISUAL PROOF . . .

Plibrico refractory linings are built for endurance



clinker cooler lining when installed

. . . and after almost 2 years service

See for yourself that despite nearly 2 years of service, this Plibrico lining hardly appears to have been in use. That's because it's a "zoned" lining, all one piece, and securely anchored. Plibrico's "zoned" lining efficiently and economically matches various refractory grades to conditions in each furnace zone. One-piece construction overcomes the needless maintenance caused by dust seepage . . . no joints for dust to penetrate. And efficient anchorage beats the vibration problem.

You can enjoy the advantages a Plibrico lining offers. See how by writing today for our catalog covering linings for calcining, drying, and processing furnaces.

Plibrico REFRACTORIES ENGINEERING CONSTRUCTION

PLIBRICO COMPANY • CHICAGO 14, ILL.
Plibrico Sales & Service in Principal Cities
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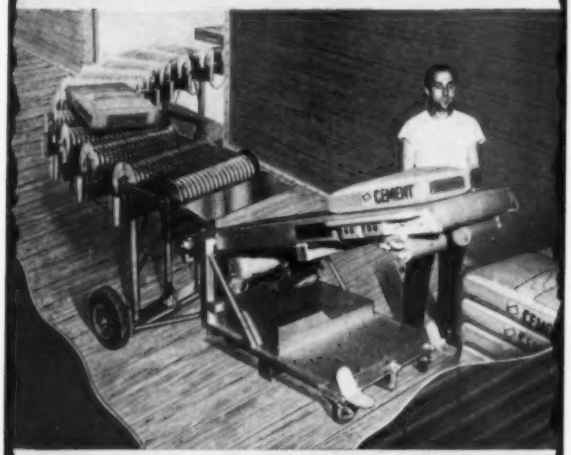
One-Man Loading for Box Cars & Trucks Is Now Possible in All Cement Plants

New Power-Curve Swivel Stacker & Loader Shoots Bags into Place, Replaces Slow Hand Truck



The Power-Curve Swivel Stacker and Loader at a large rock products company uses but one operator who merely guides bags a little with one hand as they stream into the car direct from the Packer. The single operator replaces a crew of four.

(Special)—The latest in bag loading techniques is now being demonstrated to cement plant operators who are fed up with the slow, old-fashioned hand wheel truck. A single conveyor-stacker system conveys the bags all the way from the packing machine and speeds up the loading, delivers cleaner, neater bags, reduces in-transit losses, and recovers spillage and loose material within the plant. The Power-Curve system is able to amortize its entire cost in less than a year.

In American and Canadian cement plants today there are in daily use 117 Power-Curve units, including 73 Packer and transfer conveyors, eleven bag flatteners and elevators, and 33 box car & truck loaders.

Virtually every cement producing area is represented in the list of Power-Curve owners, with new additions every month.

Backing up the news of the money saving new system is a network of Power-Curve representatives in all areas equipped with sound movies in color showing actual cement operations and the effortless loading of the new swivel stacker.

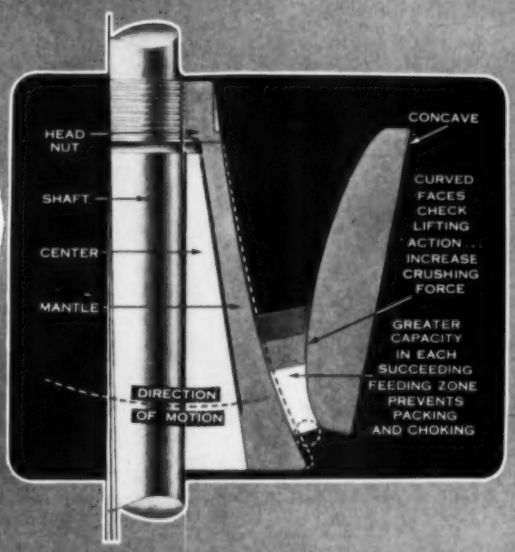
For complete details write the Cement Sales Division,

POWER-CURVE
CONVEYOR COMPANY
2185 SOUTH JASON ST., DENVER 23, COLORADO
Enter 176-B on card, page 123

type TY GYRATORY CRUSHER

Traylor-made for uniform secondary reduction

Traylor TY Reduction Crushers require minimum floor space and little head room, with features that combine high production, economy of operation and lower maintenance costs.



Traylor's curved concaves used in the TY Crusher enable operators to secure large tonnages of small product of uniform size with low percentage of oversize and waste fines. Traylor TY Reduction Crushers are built in six sizes from 1'-3" to 5'-6" and with feed openings from 3" to 22". Write for bulletin #8112 today!

Traylor

ENGINEERING & MFG. CO.

1125 MILL ST., ALLENTOWN, PA.

Sales Offices: New York — Chicago — San Francisco

Canadian Mfr.: Canadian Vickers, Ltd., Montreal, P.Q.

when the stone comes tumbling down...

HENDRICK PERFORATED PLATE STANDS UP!

Hendrick H Quality Steel Plate stands up under the toughest, heavy-duty screening of crushed stone. It's made from high carbon or stainless steels. High carbon can be heat-treated after perforation for longer life. It screens faster and easier, while full openings eliminate blinding. Product uniformity is assured throughout the life of the screen. Deck changes are quick, for lowered labor costs.

Hendrick H Quality Steel Perforated Plate is available either flat, corrugated or stepped, in any desired shape, and with perforations of any size.

HENDRICK MANUFACTURING COMPANY
39 Dundaff Street Carbondale, Pa.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Pan Steel Flooring Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

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PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

ARMSTRONG, BRAY & CO.
5374 Northwest Highway, CHICAGO 30, U. S. A.

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YOU CAN BUY OR SELL IT BETTER THAN ANYWHERE ELSE IN PIT & QUARRY'S

Broadcast Section

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BARGAINS Retired from Operations Will Be Sold at Any Reasonable Offer

HAMMERMILLS

Two—Pennsylvania, Thor-Ajax, SXR 100, 10" x 55" Opening, capacity 100 TPH #4 Mesh, Reversible Hammers, Excellent condition.

GYRATORY CRUSHERS

Two—Superior McCully 10", 30 TPH at 1¼" setting, 63 TPH at 3½" setting, both crushers are in very good condition.

CRANES

Two—Link Belts, Model K-42, crawler travel, 1½ yd. capacity, 50 ft. booms, and powered by Cummins Diesel Engines. Working now.

Thew-Lorain, Model 75-B.

Link Belt, Model K-48.

Lima, Model 1201.

ELECTRIC SHOVEL

Marion 490-2300 Volt 2½ yd. Bucket-Ward Leonard Controls. Can be inspected while in Quarry operation.

Marion 480—G.E. Equipment, Rheostatic Controls. Additional service parts available.

JAW CRUSHER

1—Buchanan, Type "B" 18" x 36", Jaw Crusher.

MIXERS

10—Mixers, T. L. Smith, 6 yd. (agitator-7½ yd.) mounted on white mod. W.C. 2864 chassis, excellent condition.

1—Smith 6½ yd. mod. 510 S, mounted on Fruehauf Tandem Trailer.

2—Rex 3½ yd. (4½ yd. agitator) mounted on KB-6, International chassis, rebuilt recently, excellent condition.

12—Mixers only—Jaeger, Mod. HM-C with Continental Engines.

1—Mixer—Jaeger Mod. 11SA mounted on two rubber tired wheels—powered with VE 4, Wisconsin Engine.

AIR COMPRESSORS

2—K500 Ingersoll-Rand.

CATERPILLAR EQUIPMENT

2—Tractors D-8 with D-13000 engines—cable control—blade.

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Bishop 2-2410 (Chicago)
Henry K. Levy, *Manager*
Surplus Equipment Department

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PRODUCER

The Wemco Sandclone:

The Cyclone Unit for New Economy and Precision in Sand Preparation

The secret is in the design — the use of relatively low feed pressures in producing the high velocities needed for efficient separation.

Wemco Sandclone action is *positive* . . . assuring profitable production, precision separation of coarse and fine particles

Its operating economies: low inlet pressure and pump speed . . . minimum pump power and wear; high pressure molded rubber liners for long life.

Get *all* the facts — and the operating potential — of the Wemco Sandclone.

Depend on the Wemco Sandclone and the skills behind it

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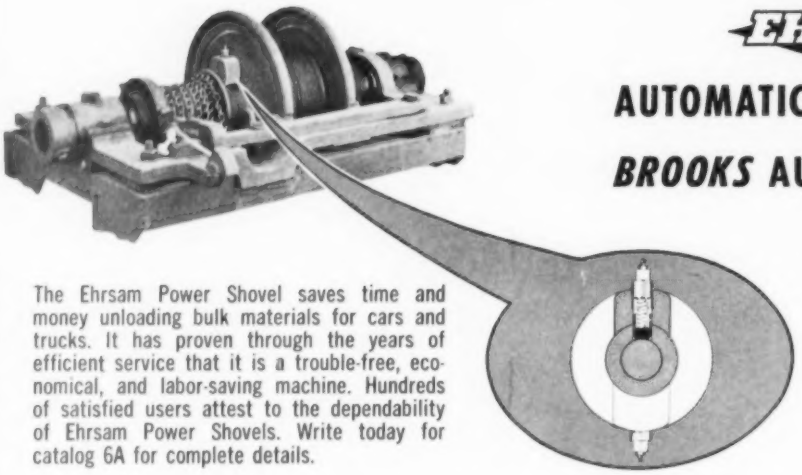
Western Machinery Company • 650 Fifth St. • San Francisco, California
and throughout the world

Designed for *efficiency*...
...Built for *service*

EHRSAM

AUTOMATIC POWER SHOVELS
with the
BROOKS AUTO-TRIP



The Ehrsam Power Shovel saves time and money unloading bulk materials for cars and trucks. It has proven through the years of efficient service that it is a trouble-free, economical, and labor-saving machine. Hundreds of satisfied users attest to the dependability of Ehrsam Power Shovels. Write today for catalog 6A for complete details.

FOUR DIFFERENT MODELS

- 5-horsepower single self-contained Power Shovel
- 10-horsepower double self-contained Power Shovel
- Single shovel without drive
- Double shovel without drive

THE J. B. EHRSAM & SONS MFG. COMPANY
ENTERPRISE, KANSAS

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East Coast Representative
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for fast, on-the-spot
CONVEYOR BELT REPAIRS

Exclusive cold self-vulcanizing material

- No heat, no equipment needed
- Applied without removing belt
- Ever-last bond won't melt, unaffected by moisture, petroleum, most acids
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JOB: Relocation of Route 5 from Longmeadow, Massachusetts, to state line of Connecticut. 2½ million yards of borrow. Started last summer.

REPORT: — "Everyone in the area, it seems, who owns a shovel and a couple of trucks, is hauling on this job," says an on-the-spot reporter.

"The center of attraction, though, is the 2-yd TL-20 TRACTOLOADER* owned by Enfield Road Construction Company, Enfield, Connecticut. It sure is building a reputation for itself.

"It fills a 12-yd truck every 3½ minutes. Averages 2,700 yd in a 10-hour day. It can be, and has been, pushed to 3,000 yd."

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See how the TL-20 can increase your production. Your ALLIS-CHALMERS dealer will be glad to show you.

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GENERAL SUPERINTENDENT required by leading construction company in Montreal, Canada. Must be experienced in maintenance and overhaul of heavy duty construction equipment and in the operation of welding and machine shop. Salary commensurate with ability. Give age, references, salary expected and full details of experience.

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35—Link Belt 10" SCREW CONVEYORS 10½'.
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Hurley Sand & Gravel Company, Inc.
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Well established Chicago Manufacturer needs an engineer to design rock crushing equipment. Previous experience in this field is essential. State full qualifications and salary expected. Write:

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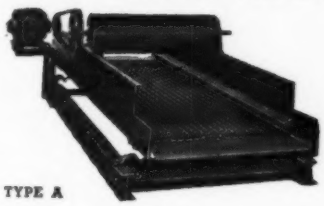

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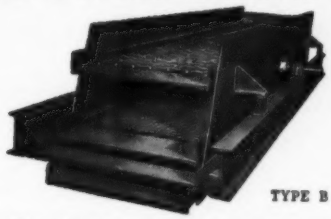

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Model Number	Screening Area	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	686
336A	3'x6'	3	858
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	986

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 8 REASONS WHY BONDED IS YOUR BEST BUY.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1620
436B	3'x6'	4	1685
138B	3'x8'	1	1510
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	2440
2410B	4'x10'	2	2400
3410B	4'x10'	3	2550
2412B	4'x12'	2	2590
3412B	4'x12'	3	2970
4412B	4'x12'	4	3165

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CONVEYOR PRICES INCLUDE BELTING

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1180 AND PRICES.**

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1397	$ 722	
14"	50'	2222	1144	$16.84
14"	85'	3377	1733	
16"	20'	1262	636	
16"	45'	2137	1088	18.04
16"	80'	3662	1350	
16"	90'	3712	1900	
18"	25'	1477	794	
18"	45'	2217	1166	
18"	70'	3142	1648	19.24
18"	85'	3697	1933	
18"	100'	4252	2220	
18"	130'	5362	2797	
20"	25'	1517	828	
20"	60'	2882	1533	20.37
20"	75'	3467	1838	
20"	90'	4052	2145	
24"	25'	1580	888	
24"	45'	2430	1330	
24"	70'	3480	1875	21.78
24"	100'	4740	2514	
24"	120'	5580	2950	
24"	150'	6840	3603	
30"	50'	2911	1617	
30"	70'	3871	2119	24.75
30"	90'	4831	2614	
36"	25'	1818	1118	
36"	45'	2858	1678	27.95
36"	60'	3638	2096	
36"	100'	5718	3214	

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Open or Enclosed, Vertical or Inclined Bucket Elevators with Continuous or Spaced Buckets mounted on Chain or Belting. Bonded's 19 standard models mean lower prices and you get a Custom Built Elevator at no extra cost.

There is a style of bucket for virtually every material or condition: wet or dry, lumpy or fine, granular slivery, or pellet shapes, hot or chemically active. A complete line of Continuous Steel, Salem Steel and Malleable Iron Buckets available in a wide variety of sizes, shapes, gauges and styles at low prices.

WRITE FOR BULLETIN #1203

Model No.	Bucket Size Inches	First 20' (Discharge Ht.)	Add or Deduct Per Ft.
Style "A" Spaced Malleable Buckets on Chain			
C53A	5 x 3¾	$1071.50	$20.25
C84A	8 x 4	1088.50	21.00
C85A	8 x 5	1235.00	25.50
C106A	10 x 6	1281.00	27.50
C127A	12 x 7	1510.00	31.25
C148A	14 x 8	1673.50	36.00
Style "A" Spaced Malleable Buckets on Belt			
B53A	5 x 3½	$1099.00	$20.50
B64A	6 x 4	1116.50	21.25
B85A	8 x 5	1311.50	27.25
B106A	10 x 6	1682.50	33.00
B127A	12 x 7	1854.50	37.25
Style "E" Continuous Steel Buckets on Chain			
C85E	8 x 5 x 7¾	$1397.00	$31.25
C126E	12 x 6 x 11¾	1589.00	34.25
C108E	10 x 8 x 11⅝	1604.00	34.75
C128E	12 x 8 x 11⅝	1624.00	35.50
C148E	14 x 8 x 11⅝	1710.00	38.75
Style "E" Continuous Steel Buckets on Belt			
B85E	8 x 5 x 7¾	$1727.50	$34.50
B116E	11 x 6 x 8¾	1839.50	38.75
B128E	12 x 8 x 11⅝	2013.00	43.50

TESTED CONVEYOR BELTING AT NEW LOW PRICES

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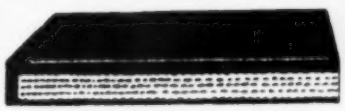

Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile. Heavy Duty 4-ply, 28-oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$3.63	$2.63
16"	4	4.08	2.77
18"	4	4.51	3.06
20"	4	4.97	3.54
24"	4	5.85	3.97
30"	4	7.18	4.85
36"	4	8.51	5.76

Major Bee Brand: 16# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies. A high grade of heavy duty 4 and 5-ply, 28 oz. duck, 1/8" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

Width	Ply	List Price Per Ft.	Sale Price Per Ft.
14"	4	$4.31	$2.85
16"	4	4.85	3.22
18"	4	5.39	3.57
20"	4	5.90	4.07
24"	4	6.94	4.60
30"	4	8.53	5.66
36"	4	10.09	6.84
24"	5	8.14	5.38

*All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices. **WRITE FOR FREE SAMPLE AND BULLETIN #1223.**

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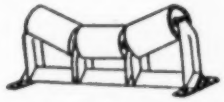

3-roll, 5" diameter Troughing Idlers for:			
14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50
1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

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3—Link Belt 30" Troughing Belt Conveyors; 90', 170', 200' c.c.
1—Link Belt 24" Troughing Belt Conveyor 160' c.c.
1—Link Belt Vibrating Screen 6' x 12'.

DONORA, PA.

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15"x20" Power Blake Jaw Crusher
24"x36" Farrell 14B Blake Jaw Crusher
30"x42" Buchanan Jaw Crusher
18"x24" Universal Jaw RB Crusher
2—28"x36" Traylor Blake Jaw Crushers
2—36"x48" Traylor Blake Jaw Crushers
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Koehring 1005 Shovel
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Lima 34 Dragline

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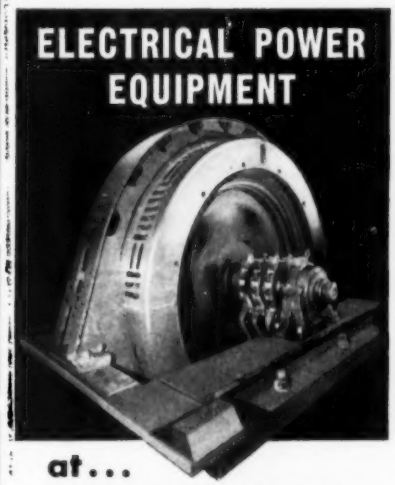

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1– 250	Whse.	Slip Ring	500	440
1– 200	G.E.	Sq. Cage	1200	440
1– 200	G.E.	Slip Ring	700	440
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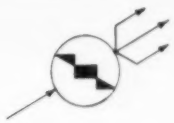

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Lorain 50, 1-yd. 31' boom, 17' stick.
Lorain 30A, ½-yd., 16' boom, 13'4" stick.
Osgood 903, 2-yd., 34' boom, 30'6" stick.

BACKHOE ATTACHMENTS

Lorain 40A, 18' boom, 7' stick, 28", 36" or 44" bucket.
Koehring 304, ¾ yd., 19' boom, 5' stick.

DIESEL POWER UNITS

Cat. D7700, 74 H.P. at 1000 PFM. Rebuilt.
Cat. D8800, 88 H.P. at 1000 RPM.
Cat. D13000, 128 H.P. at 1000 RPM. Rebuilt.
GM 3021G, 3-cylinder, new.
GM 671, 6-cylinder. Rebuilt.
GM twin diesel. Rebuilt.

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105 cu. ft. Leroi Tractair with dozer, backhoe.
6—125 cu. ft. Gardner-Denver gas portables.
125 cu. ft. Jaeger gas portable.
210 cu. ft. Gardner-Denver diesel portable.
210 cu. ft. Schramm gas portable.
315 cu. ft. Schramm gas portable.
600 cu. ft. Ingersoll Rand, Waukesha power.
2—600 cu. ft. Gardner-Denver diesel portables.

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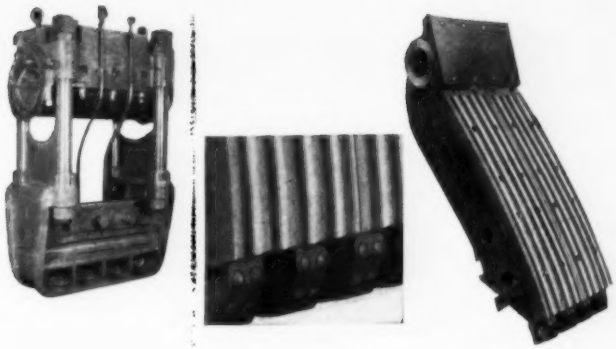
deep-frame crushers give you design extras that turn into profits



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World-Wide Agent Representation. Contact home office for nearest representative.

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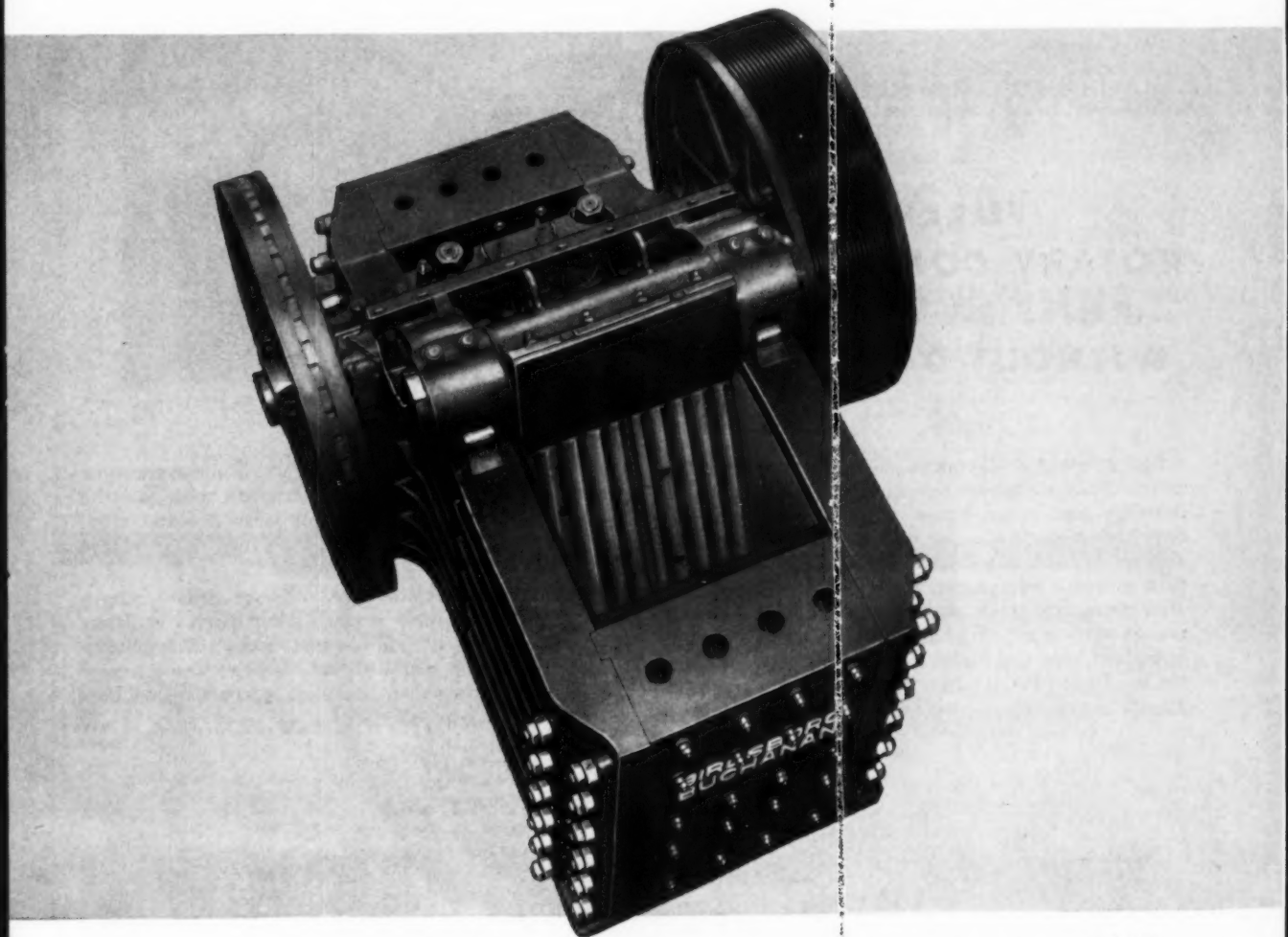

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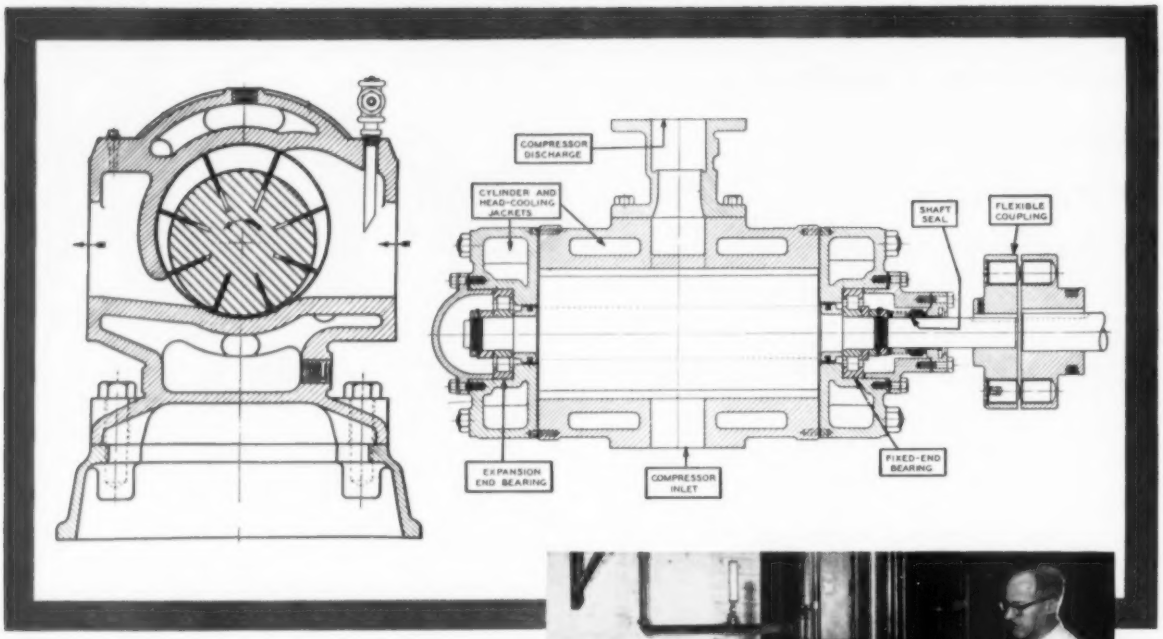
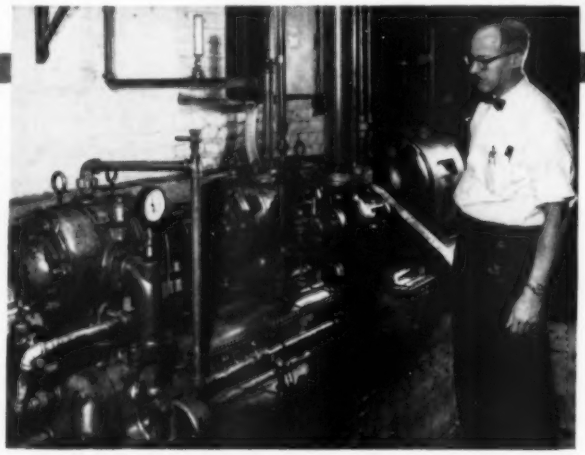


Hard service never affected this Fuller rotary's original output—230 cfm. of air at 90 lb. G., reports Mr. Schott, chief engineer, Thomas C. Wilson, Inc., Long Island City, N.Y.



FULLER ROTARY COMPRESSOR RUNS 13 YEARS WITHOUT DOWNTIME

A Fuller rotary at Thomas C. Wilson, Inc. got its first maintenance shutdown recently, for renewal of roller bearings and rotor vanes—after running without downtime since 1945.

4 years of 24-hour service. The Wilson plant makes tube cleaning equipment, tube expanders and portable pneumatic tools, and so makes heavy daily demands on shop air. For the first four years, three-shift operation kept the Fuller rotary running round the clock. Since 1949, it's been working eight-hour shifts.

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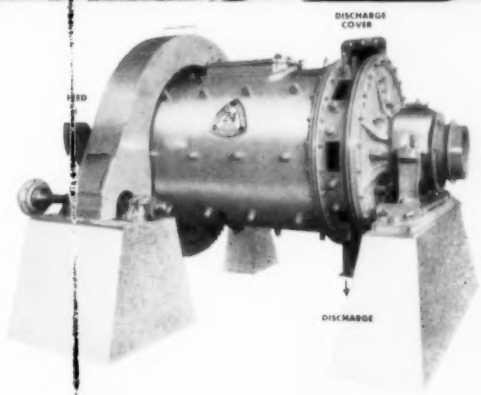
We have helped many mill operators with our more than 30 years of grinding experience. Complete grinding test facilities are available at no charge to establish a grindability index that can be translated into the correct size mill to solve your problem, increase your profits. For example, we recently conducted a test so an operator could check the recommendations of another manufacturer. Where a large mill had been recommended, our experience in grinding techniques determined and demonstrated that a smaller DENVER mill would produce the desired product and tonnage—a saving of over $20,000 in initial cost and over 100 HP.

Write for "Production of Specification Sand by Rod Mills"—a bulletin of technical information for operators who have sub-specification sand deposits.



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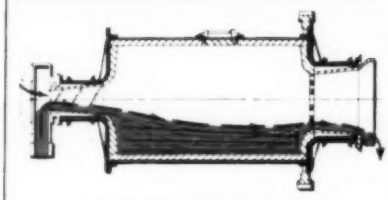
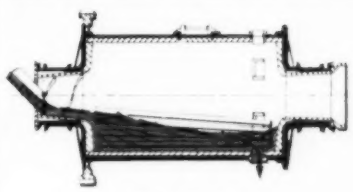
DENVER STEEL HEAD MILLS SHOWING TYPICAL DISCHARGE ARRANGEMENT



Medium or Large Trunnions with or without Grate Discharge



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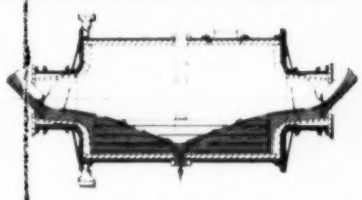

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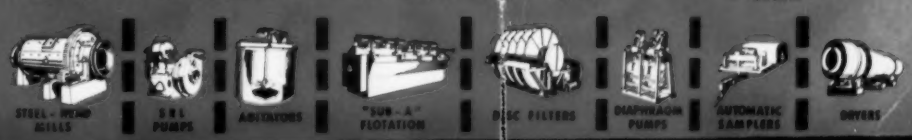
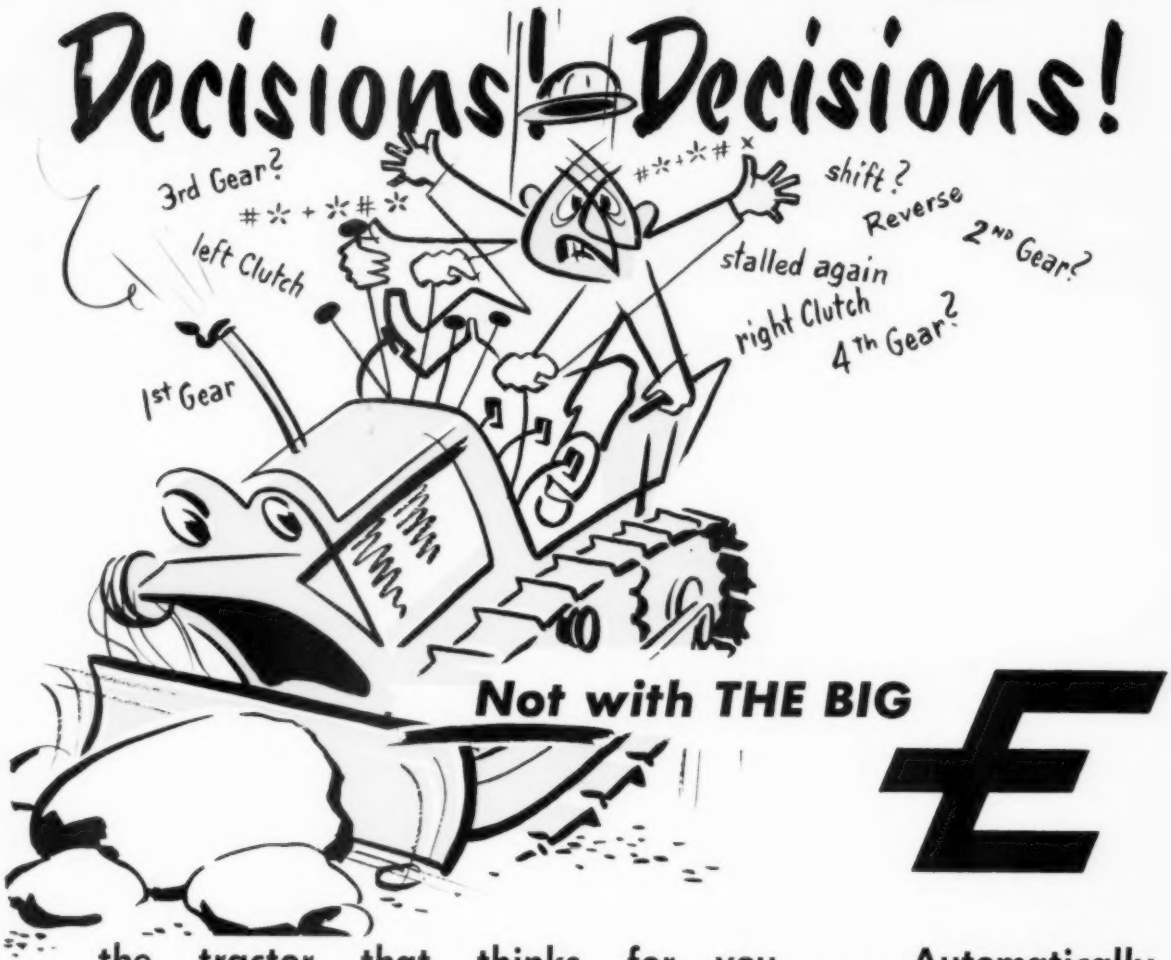


Decisions! Decisions!



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